# WMO2 G900 / G1800 / G1900 GSM MODEM

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# 1 Introduction

This document is intended for every person being brought to work with the modem WISMO WMO2 G900, G1800 or G1900.

## 1.1 Document scope

This document presents the technical characteristics of the connections, interfaces and power supply of the modem WISMO WMO2 in the G900, G1800 and G1900 terminal version.
This document describes the AT commands allowing the user to issue communications in the voice, data or fax mode with the modem WISMO WMO2 G900, G1800 and G1900 and for SMS's reception and expedition.

## 1.2 Related documents

This interface document is based on the following recommendations and reference documents:

| | | |
|---|---|---|
| [1] | ETS 300 019 | Environmental conditions and environmental tests for telecommunications equipment. |
| [2] | SAE J1113 | Transients Voltage Suppression in Automotive Vehicle. |
| [3] | WAVE | Internal Qualification Plan version 1.1. |
| [4] | ETSI GSM 07.05 | European digital cellular telecommunication system (phase 2); Use of DTE-DCE interface for Short message service and cell broadcast service |
| [5] | ETSI GSM 07.07 | European digital cellular telecommunication system (phase 2); AT command set for GSM Mobile Equipment |
| [6] | ITU-T V.25 ter. | Serial asynchronous automatic dialling and control |
| [7] | ETSI GSM 03.40 | European digital cellular telecommunication system (phase 2); Technical realisation of the Short Message Service (SMS) Point-to-Point (PP) |
| [8] | ETSI GSM 03.38 | European digital cellular telecommunication system (phase 2); Alphabets and language-specific information |
| [9] | WMO2sp14 | Technical characteristics of the WMO2 modem line. |
| [10] | SII015 v7.9 | AT-Commands interface layer specification for the phase 2 software of the WMO2 modem line. |

## 1.3 Definitions

For the purposes of the AT-commands interface description in this document, the following definitions apply:

| | |
|---|---|
| Command mode: | In Command mode, the modem is not communicating with a remote station, and is ready to accept commands. When powering-up, the modem automatically enters this mode, and automatically returns to this mode when a call is disconnected. |
| Online mode: | Also called data mode: In Online mode, the modem is communicating with a remote station. Data coming through the RS232 serial link are treated as data and transmitted to the called part, and data received from the called part are transmitted to the terminal through the RS232 serial link. Online mode is activated by successful completion of a command, either manually or automatically, to originate or answer a call, or by receiving the ATO command to return to online mode from Command mode. |
| [...]: | Items enclosed in square brackets are optional. The square brackets themselves must not appear in the command line. |
| <...>: | Some syntactical elements are mentioned enclosed in angle brackets. Actually the meaning (values) for those elements must appear in the command and the angle brackets are omitted. |

All other characters, including " " ", "&", "?", "=", parentheses, etc., shall appear in commands as written.

## 1.4 Acronyms and abbreviations

For the purposes of the AT-commands interface description in this document, the following abbreviations apply:

# 2 Technical Data

This section deals with the specifications of the second generation of Wavecom's GSM modem. Under the generic reference WMO2-GXXXX are 3 different modems grouped: WMO2-G900 for GSM standard, WMO2-G1800 for DCS standard and WMO2-G1900 for PCS standard.
All these modems are based on WISMO concept, it means each modem includes a WISMO1B-Gxxxx module.
In this section you will find, on the one hand the description of the basic modem offer and, on the other hand several accessories description.

## 2.1 Basic offer

### 2.1.1 Contents

The basic offer comprises the following elements:

- Modem
- Mechanical fixation (holding bridle)
- Power supply cable + fuse
- User manual

### 2.1.2 Packaging

The Basic offer set is presented in a unique conditioning, Which external dimensions are close to the following values:

70mm (width) x 60mm (height) x135mm (length).

This is a cardboard box. It is build-in small waves, which are covered with a thin film of white ice-cold paper.

### 2.1.3 User manual

The user manual is realised in a size closed to the following values:

105mm (width) x 148,5 mm (height) (that is 1/2 A5).

It contains twenty-two pages except the cover page.

## 2.2 Accessories

### 2.2.1 Cordons

Two cordons could be proposed:

- serial link and audio cable (Y cordon) for a low power audio solution (for example: headset, phone receiver, ...),
- serial link and audio cable (Y cordon) for Car Kit option that is with a higher power on the audio part.

#### 2.2.2 Headset

The headset allows audio hands free function. This feature implements a weak power speakerphone and a microphone.
*TBD: standard products*

#### 2.2.3 Antenna

Two solutions could be proposed:

- a standard deported cellular phone antenna,
- a WAVECOM designed short antenna.

#### 2.2.4 Power supply

An AC/DC converter (220V~ / 12V-2A) enables a direct powering on the power network.

### 2.3 Options

#### 2.3.1 Car Kit

Thanks to an audio power amplifier, a microphone - that can be fixed on a vehicle's sun visor - and a loud speaker - that can be fixed on the vehicle dashboard -, one can obtain a hands free embedded solution.

Speaker (8Ω) and directional microphone are supplied with this option.

### 2.4 Product references

#### 2.4.1 Ordering references

The WMO2 modem product line references are set up using the WMO2-GXXXX base.
The references respect the following syntax:

- WMO2-G900 for the GSM 900 standard;
- WMO2-G1800 for the DCS 1800 standard;
- WMO2-G1900 for the PCS 1900 standard.

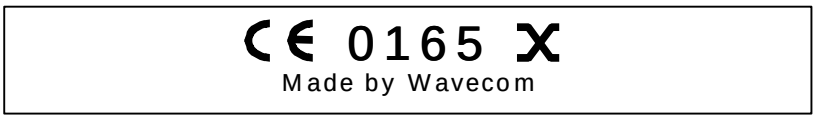
#### 2.4.2 Markings and Labels

##### 2.4.2.1 Product label

This label is built with anodise aluminium. It has a blue silk screen treatment (marking: aluminium colour) and is fitted on the upper convex mechanical side. It supports the WAVECOM logo.
Dimension: 96x10 mm.

#### 2.4.2.2 Production sticker

This label is located on the bottom side of the product and contains CE marking (in order to improve the productivity on assembly line, this marking will be printed or silk screen treated in advance).
Dimension: 60x9.5 mm.




#### 2.4.2.3 CE and IMEI sticker

This label is placed on the bottom of the product, it contains the following legible information

- REF PROD: (WMO2-GXXX)
- P/N (WMXXXXX)

and IMEI number in barre code.
This last one includes the product serial number.
Dimensions: 60 x 9.5 mm.

#### 2.4.2.4 Label packaging

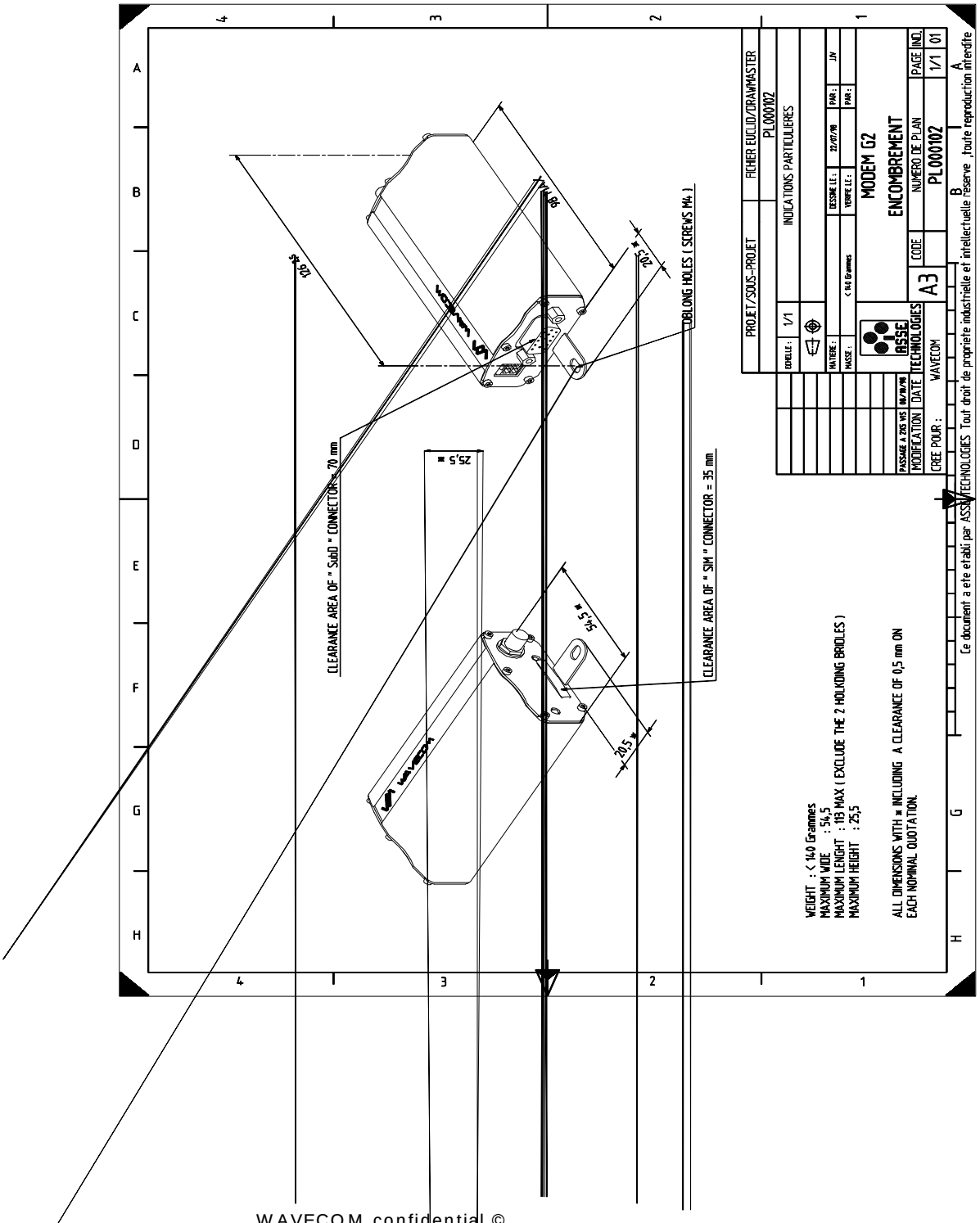
This label is put on the product box and defines the contents.

## 2.5 Physical characteristics

### 2.5.1 Shape

The physical shape is given as follow:

| Physical characteristic | Qualification | Comments |
|---|---|---|
| Dimension<br>Absolute maximum dimension | 98x54x25 mm<br>110x54x25 mm | Without the connectors quotations. |
| Weight | < 140 g | |
| Volume | 13.23 cm3 | |
| Case | | Aluminium profile |


CLEARANCE AREA OF " SubD " CONNECTOR = 70 mm
CLEARANCE AREA OF " SIM " CONNECTOR = 35 mm
OBLONG HOLES ( SCREWS M4 )
WEIGHT : < 140 Grammes
MAXIMUM WIDE : 54,5
MAXIMUM LENGHT : 110 MAX ( EXCLUDE THE 2 HOLDING BROLES )
MAXIMUM HEIGHT : 25,5
ALL DIMENSIONS WITH * INCLUDING A CLEARANCE OF 0,5 mm ON EACH NOMINAL QUOTATION.
MODEM G2
ENCOMBREMENT
PL000102
A3
WAVECOM
TECHNOLOGIES
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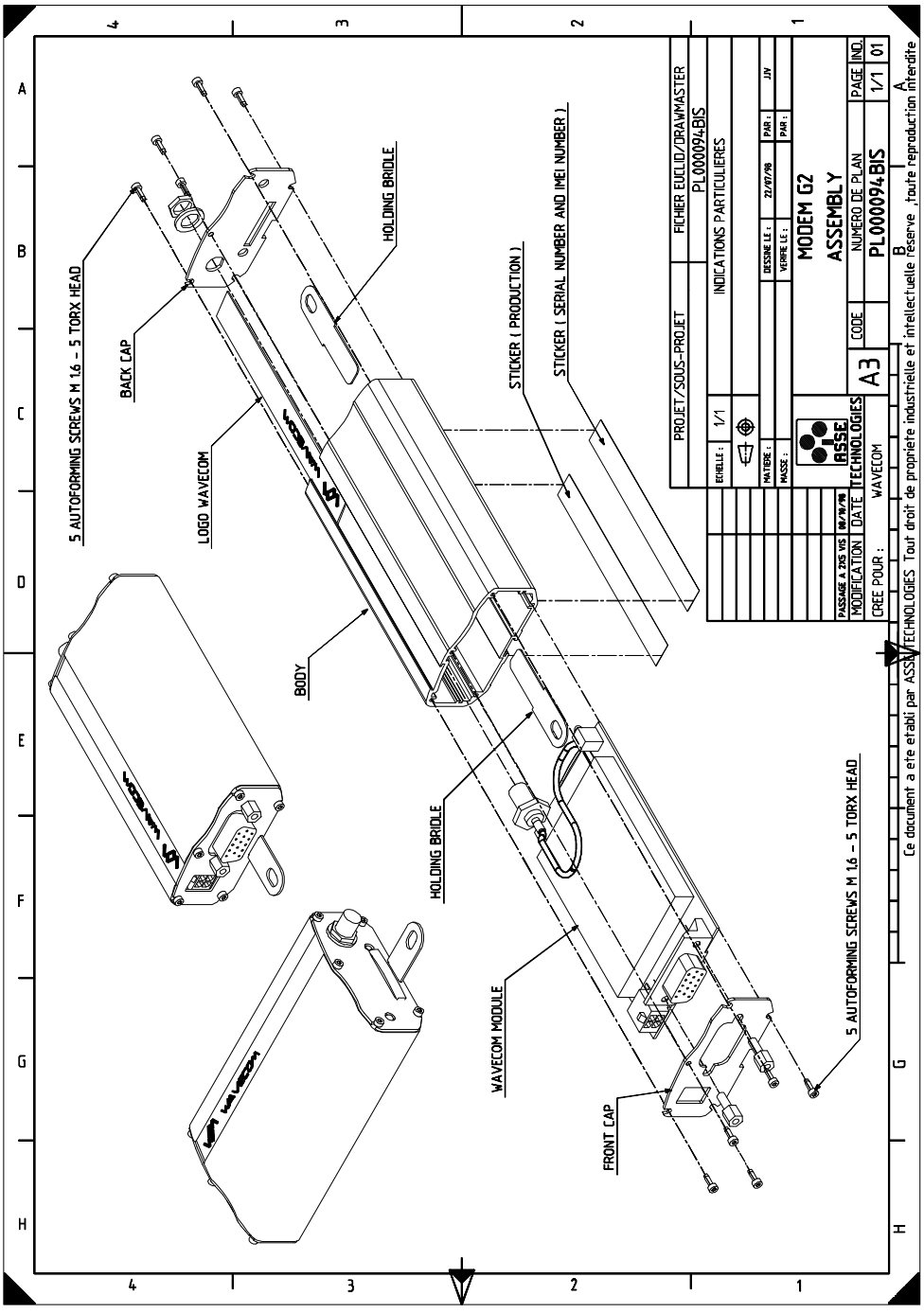
### 2.5.2 Mechanical philosophy

The mechanical casing of the WMO2 modem line is built from an aluminium profile ended by two stoppers at each edge.

All input/output interfaces are realised through three connectors placed at the two extremities of the profile. No cordon is fixed to the casing.

The SIM card (micro-SIM) is put on an extractable drawer.

A red LED indicates the functioning mode of the product.



## 2.6 Conditions of use

### 2.6.1 Climatic and mechanical environment

The following figure shows environment standard constraints:

| WMO2_Gxxx | | ENVIRONNEMENTAL CLASSES | | |
|---|---|---|---|---|
| TYPE OF TEST | STANDARDS | STORAGE Class 1.2 | TRANSPORTATION Class 2.3 | OPERATING (PORT USE) Class 7.3 |
| Cold | IEC 68-2-1 Ab test | -25°C 72h | -40°C 72h | -20°C 16h |
| Dry heat | IEC 68-2-2 Bb test | +70°C 72h | +70°C 72h | +55°C 16h |
| Change of temperature | IEC 68-2-14 Na/Nb test | | -40°/+30°C 5 cycles t1 = 3h | -20°/+30°C 3 cycles t1 = 3h |
| Damp heat cyclic | IEC 68-2-30 Db test | +30°C 2 cycles 90%-100% RH variant 1 | +40°C 2 cycles 90%-100% RH variant 1 | +40°C 2 cycles 90%-100% RH variant 1 |
| Damp heat | IEC 68-2-56 Cb test | +30°C 4 days | +40°C 4 days | +40°C 4 days |
| Sinusoidal vibration | IEC 68-2-6 Fc test | 5-62 Hz : 5 mm/s 62-200 Hz: 2 m/s2 3 x 5 sweep cycles | | |
| Random vibration wide band | IEC 68-3-36 Fdb test | | 5-20 Hz : 0.96 m2/s3 20-500 Hz: -3 dB/oct 3 x 10 min | 10-12 Hz : 0.96 m2/s3 12-150 Hz: -3 dB/oct 3 x 30 min |

### 2.6.2 Electrical environment

The following table sums up electrical constraints in an automotive environment:

| Length of transient | Cause | Energy capability<br><br>Voltage Amplitude | Possible frequency of application |
|---|---|---|---|
| Steady state | Failed Voltage Regulator | oo<br>+ 18 V | Infrequent |
| 3 - 5 minutes | Jump start with 24 V battery | oo<br>+/- 24 V | Infrequent |
| 200ms to 400ms | Load dump - i.e., disconnection of battery while at high charging rates | ≥10 J<br>≤125V | Infrequent |
| < 0.32 s | Inductive Load Switching Transient | <1 J<br>-300V to +80V | Often |
| < 0.20 s | Alternator Field Decay | <1 J<br>-100V to -40V | Each Turn-Off |
| 90ms | Ignition Pulse, Battery Disconnected | <0.5 J<br>≤75V | <500Hz Several Times in vehicle Life |
| 1ms | Mutual Coupling in Harness (Note) | <1 J<br><200V | Often |
| 15µs | Ignition Pulse, Normal | <0.001 J<br><3V | <500Hz Continuous |
| | Accessory Noise | <1.5V | 50 Hz to 10 kHz |
| | Transceiver Feedback | 20mV | R.F. |

Note: These transients may be present on any wire in the vehicle.

## 2.7 Electrical characteristics

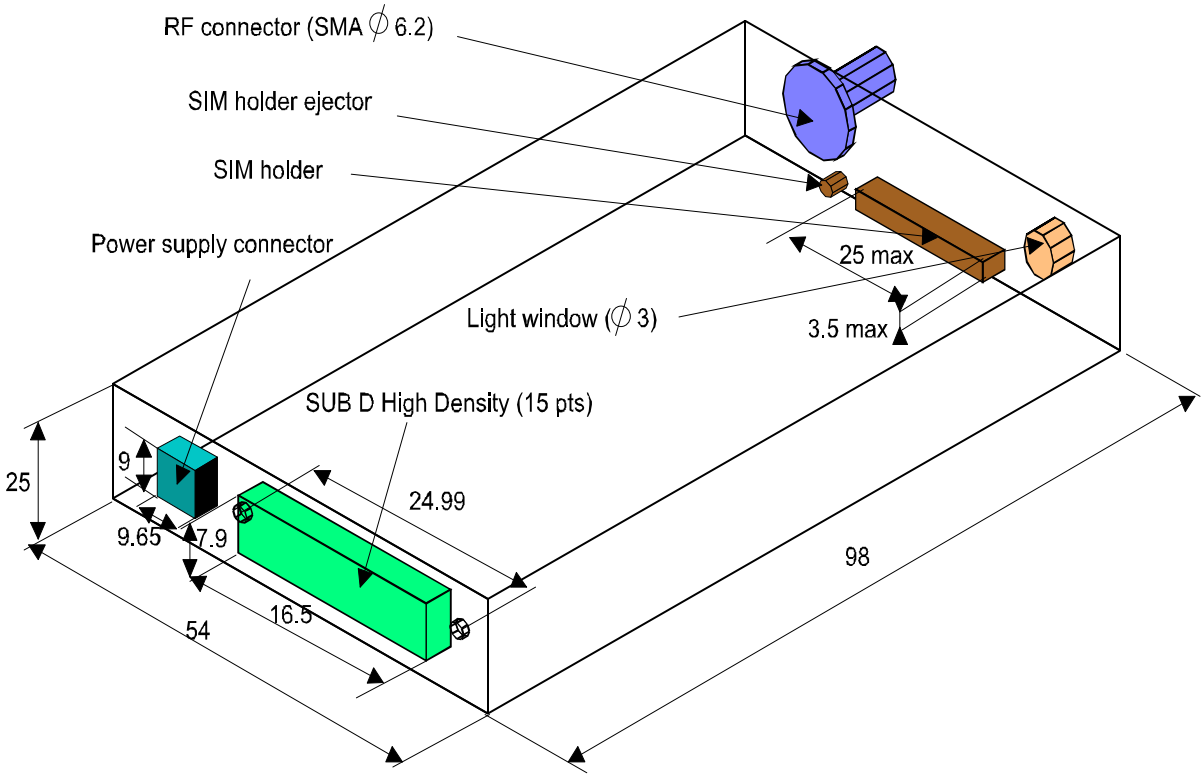
The following table summarises the electrical characteristics defined for the different input/output connections.

| Parameters | MIN | TYP | MAX | UNIT | Comments |
|---|---|---|---|---|---|
| Power supply: | | | | | |
| Input supply voltage | 5*/6** | 13,5 | 32 | V | GSM or DCS/PCS |
| Input supply voltage with Car Kit option | | 13,5 | 18 | V | |
| Input peak supply current @5V*/ 6V** | | | 2,5*/ 0,9** | A | GSM or DCS/PCS |
| Input average supply current @5V*/ 6V** in communication mode | | | 450*/200** | mA | GSM or DCS/PCS |
| Input average supply current @5V*/ 6V** in idle mode (paging period 480ms) | | | 35 | mA | |
| Input average supply current @5V* in idle mode with auto-shutdown function*** | | | 10 | mA | |
| Serial link: | | | | | |
| RS232 | | | | | standard |
| Audio (head set): | | | | | |
| microphone input current @2V/2KΩ | | 0,5 | | mA | |
| absolute microphone input voltage | | | 100 | mVpp | |
| speaker output current 150Ω //1nF | | 16 | | mA | |
| absolute speaker impedance | | | 32 | Ω | |
| SIM | 3 | | 5 | V | |

* only GSM devices.
** only DCS and PCS devices.
*** auto shutdown function could be activate if the serial link leads a non hardware flow-control (CTS/RTS non used). This hardware feature will not be available with the first products.

# 2.8 Connectors

## 2.8.1 Connector location

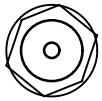
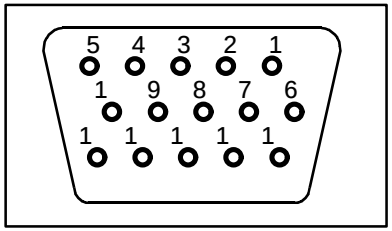
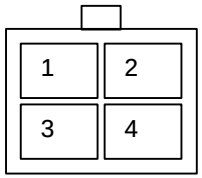



## 2.8.2 Connectors description

We considered the following constraints in the connector choice:

- Size;
- Mechanical characteristics;
- Electrical performances;
- Industrialisation (surface assembly choice).

In order to extract or insert the Micro SIM card, it is strongly recommended to press with a sharp element (a pen for example) the SIM holder ejector.
If this procedure is no respected, the SIM holder could be destroyed.

| Function connector | Type | Pining | Drawing | Ref. supplier | Mating connector examples |
|---|---|---|---|---|---|
| RF connector | SMA | |  | RADIALL:<br>R284310085 | RADIALL:<br>R125073 |
| Serial link<br><br><br><br><br><br><br>AUDIO link<br><br><br>BOOT<br>RESET | SUB D<br>High<br>Density<br>(15 pt.) | 1 DCD (CT109)<br>2 TX (CT103)<br>6 RX (CT104)<br>7 DSR (CT107)<br>8 DTR (CT108/2)<br>9 GND<br>11 CTS (CT106)<br>12 RTS (CT105)<br>13 RI (CT125)<br>4 MICROPHONE (+)<br>5 MICROPHONE (-)<br>10 SPEAKER (+)<br>15 SPEAKER (-)<br>3 BOOT<br>14 RESET |  | JST:<br>KSEY-15S-3B6L18-13 | ITT CANNON:<br>ZDEA-15P-SB<br>or<br>JST:<br>KEC-15P<br>with contact JK-SP2143 |
| Power Supply connector | Micro-Fit (4pts) | 1 V+BATTERY<br>2 GROUND<br>3-4 AUXI |  | MOLEX:<br>43045-0409 | MOLEX:<br>43025-0400 |
| SIM holder | | | | MOLEX:<br>52828-0611 | MICRO SIM |

## 2.9 Capabilities

Functions of the WMO2 modem line are defined as follow:

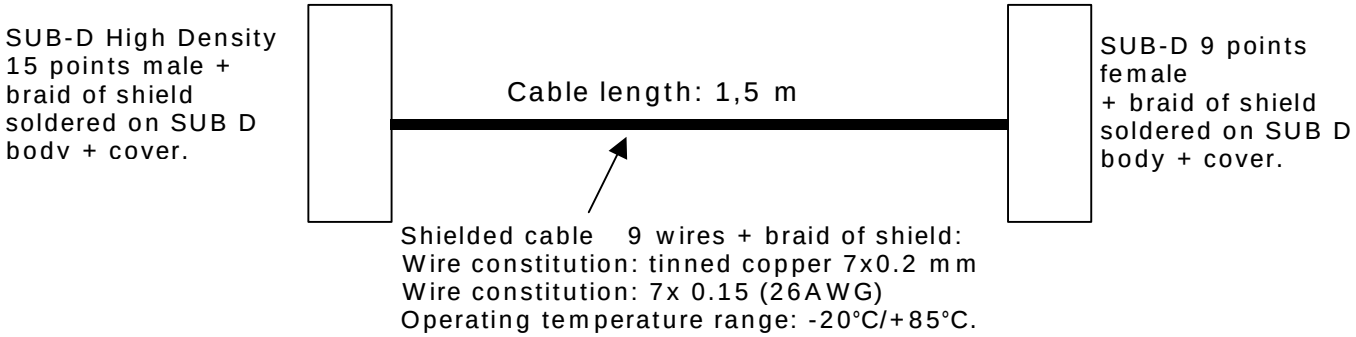
| | GSM | DCS/PCS |
|---|---|---|
| Standard | 900 MHz.<br>Class 4 (2W).<br>GSM phase 2. | 1800 MHz or 1900 MHz<br>Class 1 (1W)<br>GSM phase 2. |
| Interface | Serial interface RS232 V.24/V.28<br>AT command set based on V.25ter and GSM 07.05 & 07.07.<br>Auto-bauding function between baud rates 2400 and 19200<br>No auto-framing available | Serial interface RS232 V.24/V.28<br>AT command set based on V.25ter and GSM 07.05 & 07.07.<br>Auto-bauding function between baud rates 2400 and 19200<br>No auto-framing available |
| SMS | Mobile Originated (MO) and Mobile Terminated (MT). Text & PDU Mode point to point. Cell broad cast.<br>In accordance with GSM 07.05 | Mobile Originated (MO) and Mobile Terminated (MT). Text & PDU Mode point to point. Cell broad cast.<br>In accordance with GSM 07.05 |
| Data | Asynchronous 2400, 4800, 9600 baud rates.<br>Transparent and Non Transparent mode<br>In Non Transparent Mode: 300, 1200, 1200/75 baud.<br>Mode 3.1 kHz (PSTN) and V110 (ISDN) | Asynchronous 2400, 4800, 9600 baud rates.<br>Transparent and Non Transparent mode<br>In Non Transparent Mode: 300, 1200, 1200/75 baud.<br>Mode 3.1 kHz (PSTN) and V110 (ISDN) |
| Fax | 2400/4800/7200/9600 baud, GSM teleservice 62 in Transparent Mode.<br>Class 1.<br>Group 3 compatible. | 2400/4800/7200/9600 baud, GSM teleservice 62 in Transparent Mode.<br>Class 1.<br>Group 3 compatible. |
| Audio | FR and EFR operation<br>1: Head Set<br>2: Car Kit (in option) | FR and EFR operation<br>1: Head Set<br>2: Car Kit (in option) |

## 2.10 Accessories description

### 2.10.1 Headset

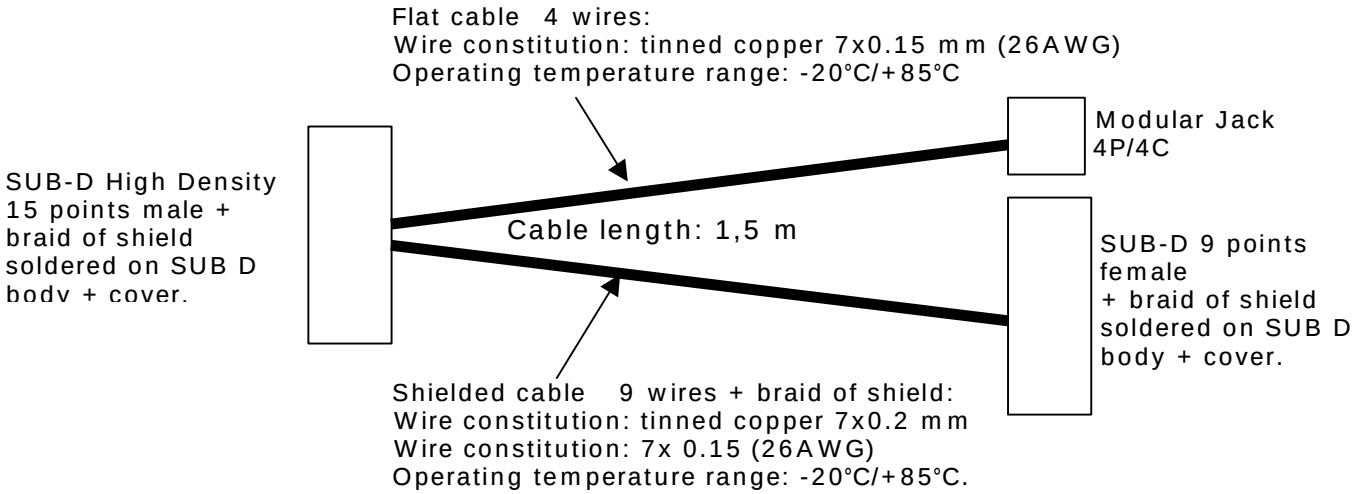
To be defined.

### 2.10.2 Serial link

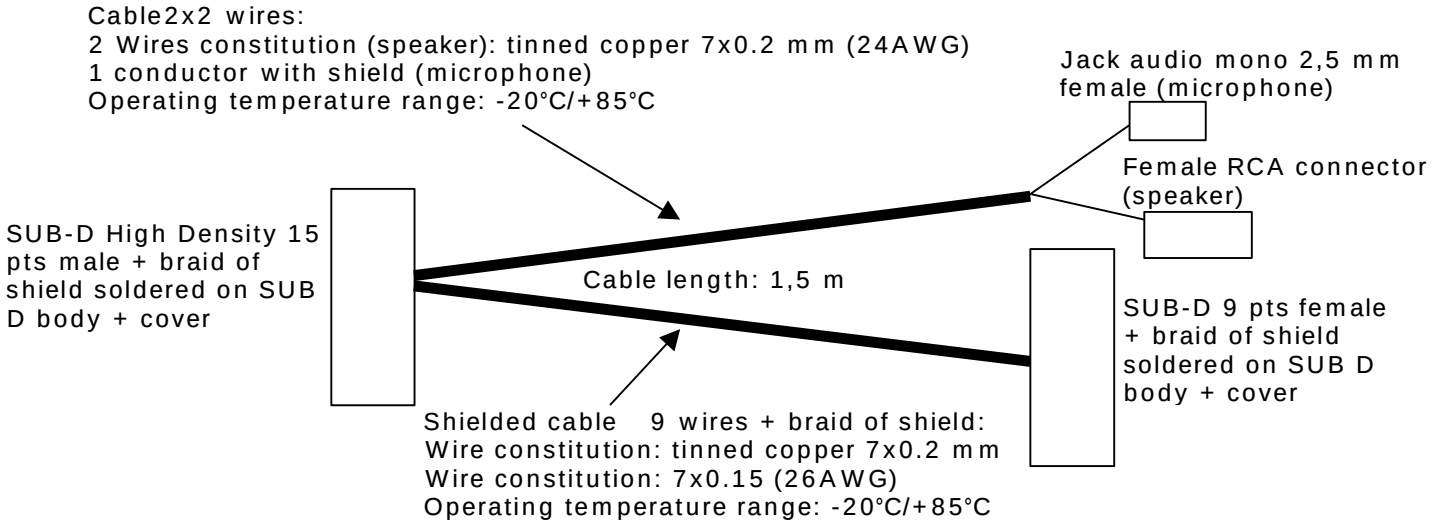

SUB-D High Density 15 points male + braid of shield soldered on SUB D bodv + cover.
Cable length: 1,5 m
SUB-D 9 points female + braid of shield soldered on SUB D body + cover.
Shielded cable 9 wires + braid of shield:
Wire constitution: tinned copper 7x0.2 mm
Wire constitution: 7x 0.15 (26AWG)
Operating temperature range: -20°C/+85°C.

## 2.10.3 Serial and audio link

### 2.10.3.1 Low power audio

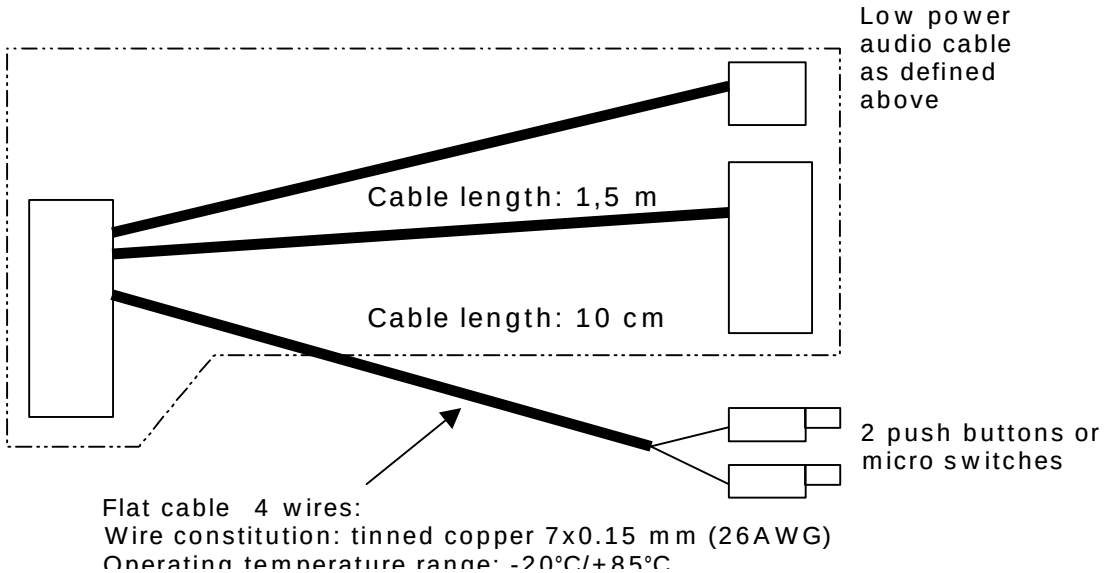

Flat cable 4 wires:
Wire constitution: tinned copper 7x0.15 mm (26AWG)
Operating temperature range: -20°C/+85°C
Modular Jack 4P/4C
SUB-D High Density 15 points male + braid of shield soldered on SUB D body + cover.
Cable length: 1,5 m
SUB-D 9 points female + braid of shield soldered on SUB D body + cover.
Shielded cable 9 wires + braid of shield:
Wire constitution: tinned copper 7x0.2 mm
Wire constitution: 7x 0.15 (26AWG)
Operating temperature range: -20°C/+85°C.

### 2.10.3.2 High power audio

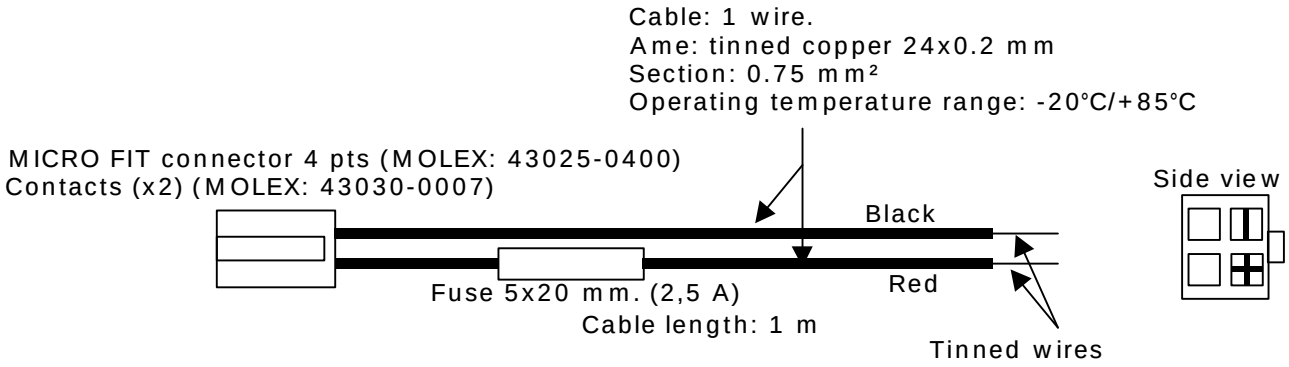

Cable2x2 wires:
2 Wires constitution (speaker): tinned copper 7x0.2 mm (24AWG)
1 conductor with shield (microphone)
Operating temperature range: -20°C/+85°C
Jack audio mono 2,5 mm female (microphone)
Female RCA connector (speaker)
SUB-D High Density 15 pts male + braid of shield soldered on SUB D body + cover
Cable length: 1,5 m
SUB-D 9 pts female + braid of shield soldered on SUB D body + cover
Shielded cable 9 wires + braid of shield:
Wire constitution: tinned copper 7x0.2 mm
Wire constitution: 7x0.15 (26AWG)
Operating temperature range: -20°C/+85°C

### 2.10.4 Remote Modem Control Link

Also called "Service cable".


Low power audio cable as defined above
Cable length: 1,5 m
Cable length: 10 cm
2 push buttons or micro switches
Flat cable 4 wires:
Wire constitution: tinned copper 7x0.15 mm (26AWG)
Operating temperature range: -20°C/+85°C

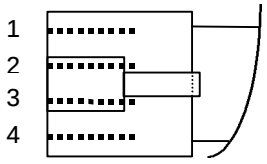
### 2.10.5 Power supply cordon



### 2.10.6 Cables pinning

Assembly example

Top view




| SUB-D 9CTS | Connection | SUB D 15CTS (RS232) | Signal name |
|---|---|---|---|
| 1 (White) | ➲ | 1 (White) | DCD (CT109) |
| 2 (Grey) | ➲ | 6 (Grey) | RX (CT104) |
| 3 (Purple) | ➲ | 2 (Purple) | TX (CT103) |
| 4 (Blue) | ➲ | 8 (Blue) | DTR (CT108/2) |
| 5 (Black) | ➲ | 9 (Black) | GND |
| 6 (Orange) | ➲ | 7 (Orange) | DSR (CT107) |
| 7 (Yellow) | ➲ | 12 (Yellow) | RTS (CT105) |
| 8 (Brown) | ➲ | 11 (Brown) | CTS (CT106) |
| 9 (Green) | ➲ | 13 (Green) | RI (CT125) |
| **Modular Jack 4P/4C** | **Connection** | **SUB D 15CTS (AUDIO)** | |
| 1 (Yellow/White) | ➲ | 4 (Yellow/White) | microphone(+) |
| 2 (Red/White) | ➲ | 10 (Red/ White) | speaker(+) |
| 3 (Green/White) | ➲ | 15 (Green/White) | speaker(-) |
| 4 (Black/White) | ➲ | 5 (Black/White) | microphone(-) |
| **Flying wires** | **Connection** | **SUB D 15CTS (Boot/Reset/GND)** | |
| (Pink) | ➲ | 3 (Pink) | BOOT |
| (Blue/White) | ➲ | 14 (Blue/White) | RESET |
| (Black) | ➲ | 9 (Black) | GND |

# 3 AT Commands interface

This chapter describes the interface based on the Hayes protocol standard between the TE and the ME. The AT commands presented here in are intended to manage voice, data and fax communication as well as SMS sending and receiving.

## 3.1 Command syntax

There are 3 types of commands:

1. Set command:
   using the = (equal) character, it is possible to assign a value to a parameter.
2. Read command:
   using the ? (question mark) character, it is possible to read the current setting of a parameter.
3. Test command:
   using the character sequence =? (equal followed by question mark), it is possible to test if a parameter is supported by the modem and to read the supported values for that parameter.

Examples:

```
AT+CPIN=####      ' to enter the PIN code of the SIM.
ATS0?             ' to determine the number of ring indicators
                  awaited before automatically answering.
AT+COPS=?         ' to determine which PLMN are currently
                  available.
```

The following only applies in command mode.

All available commands for the WMO2 modem line are presented in the chapter 4.

### 3.1.1 Request syntax

#### 3.1.1.1 Basic syntax

At fixed baud rate uppercase or lowercase letters can be used to type in the AT-Commands. But the use of both upper and lowercase characters in the same command is not permitted.

The end character, except in some cases for which it is indicated, is always the <CR> (Carriage Return) character.

The syntax is based on the nominal Hayes standard:

- Each command begins with a 2 letters prefix "AT" (ATtention) except the "+++" and the "A/" commands;
- The command's body is a single character or an & (ampersand) character immediately followed by a single character;
- A + (plus) character may immediately follow the AT prefix to indicate it is an extended command format in that case, a letter (chosen among the following one: A, C, D, E, F, G, I, M, S, T, V or W) immediately follows the + character, then comes the command itself (the body);
- The parameters (if any) of the command are placed at the end.

Examples:

```
ATA          ' to answer a call.
AT&W         ' to store the profile in memory.
ATQ1         ' to suppress the extended syntax result codes.
ATS0=2       ' to automatically answer a call after 2 rings.
```

It is possible to concatenate several commands on the same command line, example: ATQ1S0=2;&W
You must insert a ; (semicolon) straight after each command that use a = (equal) or ? (question mark) character and after each extended format command.
There is no need of any special character for all other commands (i.e. there are no ; (semicolon) between the Q1 and S0=2 commands above, but there is one straight after the S0=2 command before the &W command.

#### 3.1.1.2 Special cases

If the serial link exchange baud rate is not fixed, case of the modem working in autobauding mode, it is not possible to type in the commands using lowercase characters.

When sending SMS messages, the end character is no longer the <CR> (carriage return), it is the <CTRL>Z character (Escape character).

### 3.1.2 Answer syntax

There are 2 types of answers: information text and result codes.

The answer of a command may be build of both an information text and a result code.

The answer may be transmitted in numeric form or alphabetic (verbose) form depending upon the setting of the V parameter.

The response, either in numeric form or in alphabetic form, consists of a header, a body and a trailer.
The header and the trailer are the same, there are build with 2 characters <CR> <LF> (Carriage return and Line Feed).

This applies for all commands except the V0 and the Q1 commands.

When the command syntax is wrong, the modem responds ERROR.

When the command syntax is correct but with incomplete or incorrect parameters, the modem responds +CME ERROR: <Err> or +CMS ERROR: <CMSErr> with the corresponding error code (<Err> respectively <CMSErr>).

If the command syntax is correct and all parameters are valid but the network refuses the command whatever the reason, the modem responds +CMS ERROR: <CMSErr>, where <CMSErr> is the reason (if any) given by the network.

The modem responds OK when the network accepted the command and both the syntax and the parameters where correct.

For some commands such as "AT+CPIN?" or "AT+EXPKEY?" or "ATQ1", the modem will not give the OK string at the end of the command execution.

Moreover there are 3 sub-types of answers. These sub-types describe answers that are return at different states of the modem.

| | |
|---|---|
| Final result type | : indicates the full completion of an AT command and can be considered as a willingness to accept new commands from the TE. Example: "OK" or "ERROR". |
| Intermediate result type | : is a report of the execution progress of the currently being treated AT command. Example "CONNECT <speed>". |
| Unsolicited result type | : indicates the happening of an event not directly ensuing from a previous AT command. Example "RING". |

## 3.2 Default settings

The following table shows the different storable parameters, the command to store them and there default value.

| Command | AT&W (E2P) | AT+CSAS (SIM, E2P) | Default value |
|---|---|---|---|
| +CMEE | X | | 0 |
| +CSCS | <char. set> | | "PCCP437" |
| ATS0 | <# of Ring> | | 0 (no auto-answer) |
| +CICB | X | | 2 (speech) |
| +VGR | <n> | | 2 (all speakers) |
| +VGT | <n> | | 2 (all microphones) |
| +SPEAKER | X | | 0 (Speaker 0 & Micro 0) |
| +ECHO | All | | 160, 12, 5, 512, 10 |
| +SIDET | X | | 1,1 |
| +CREG | <mode>,<form> | | 0 |
| +CLCK | X | | No SIM or Network lock |
| +CPWD | <pwd> | | 00000000 (SIM & Net lock) |
| +WAIP | <mode> | | 0 |
| +CMGF | <mode> | | 1 (text) |
| +CSDH | X | | 0 |
| +CNMI | All | | 0, 0, 0 |
| +CSMP | | All | 1, 67, 0, 0 |
| +CSCA | | <sca> | SIM dependant (phase 2) |
| +CCWA | <n> | | 0 |
| +CLIR | <n> | | 0 |
| +CLIP | <n> | | 0 |
| +COLP | <n> | | 0 |
| +CBST | All | | 0, 0, 1 |
| +CRLP | All | | 61, 61, 48, 6 |
| +CR | <mode> | | 0 |
| +CRC | <mode> | | 0 |
| +IPR | X | | 0 (autobaud) |
| +IFC | X | | 2,2 |
| +ICF | X | | 3,4 |
| E | X | | 0 |
| &C | X | | 1 |
| &D | X | | 1 |
| Q | X | | 0 |
| V | X | | 1 |
| &S | X | | 1 |

The default setting of the RS232 serial link handler shown above in the table corresponds to the following setting:

Baud rate : Autobauding (admitting rates from 2400 to 19200 bps)
Data length : 8 bits
Parity : None
Stop bit : 1
Flow control : Hardware (RTS/CTS)

To tune this settings please use the commands +IPR, +IFC and +ICF.

## 3.3 Global behaviour

### 3.3.1 SIM Insertion, SIM Removal

SIM card Insertion and Removal procedures are supported. These are software functions based on the reading of the hardware SIM presence pin. This pin state (open/closed) is continuously watched.

When the SIM presence pin indicates a presence of "somewhat" in the SIM connector, the module tries to establish a SIM logical session. Depending if the "somewhat" is a SIM Card or not, the SIM logical session will be successfully established or not.

The AT+CPIN? command delivers the following answers:

- If the SIM presence pin indicates "nothing", the answer to AT+CPIN? is "+CME ERROR: 10" (SIM not inserted).
- If the SIM presence pin indicates "something" and the inserted Card is a valid SIM Card, the answer to AT+CPIN? is "+CPIN: xxx" depending of the SIM PIN state.
- If the SIM presence pin indicates "something" and the inserted Card is not a valid SIM Card, the answer to AT+CPIN? is "CME ERROR: 10".
- These both last status are not immediately available after powering-up due to the background initialisation. During this step and before the SIM presence pin indicates "somewhat", the AT+CPIN? command returns "+CME ERROR: 515" (Please wait, initialisation in progress).

When the SIM presence pin indicates "nothing" and the previously inserted SIM Card was removed, an IMSI detach procedure is executed, and all the user data corresponding to this previous SIM are removed from the memory (Phonebooks, SMS etc.).
The modem can then still emit calls but only in the emergency mode (only emergency numbers can be dialled).

### 3.3.2 Background initialisation

After a valid PIN entry, many SIM user data information are loaded in the modem memory (Phonebooks, SMS status...). This operation can last a long time when reading huge phonebooks.

The AT+CPIN? command answers just after verification of the PIN. User Data are loaded in background after the PIN checking.

This means, that some data of the SIM may not be available straight after the "OK" (if PIN is valid) of the PIN Entry function was received by the TE. Data that may be affected are particularly the phonebook's entries.

So that any access to phonebooks features will then be refused by the following error message "+CME ERROR: 515" or "+CMS ERROR: 515" meaning "please wait, service is not available, initialisation in progress".

Also this kind of answer may be returned by the modem in several circumstances:

- when trying to execute another AT command before the previous one was executed to the end.
- when swapping from (or to) ADN to (or from) FDN and trying to immediately read the concerned phonebook;
- when giving the +CPIN? command (SIM Status) just after a SIM insertion and before the modem could execute a valid SIM Card logical session.

# 4 Commands set

For convenience the <CR> and <CR><LF> sequences are not indicated in the examples shown in the following description.

## 4.1 General commands

### 4.1.1 Manufacturer identification +CGMI

This command gives the manufacturer identification.

It is only a read command.
There is no possibility to set a value or to test the parameters.

Command Syntax: AT+CGMI

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CGMI | *Get manufacturer identification* |
| GSM to application | WAVECOM MODEM<br>OK | *Command valid, Wavecom modem* |

### 4.1.2 Request model identification +CGMM

This command is used to get the supported bands (GSM 900, DCS 1800, PCS 1900).

The answer could be a combination of different bands in the case of multiband modem.

It is only a read command.
There is no possibility to set a value or to test the parameters.

Command Syntax: AT+CGMM

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CGMM | *Get hardware version* |
| GSM to application | 900P<br>OK | *GSM 900 MHz primary band, or "900E" (extended band), "1800" (DCS), "1900" (PCS) or "MULTIBAND"* |

### 4.1.3 Request revision identification +CGMR

This command is used to read the software version.

It is only a read command.
There is no possibility to set a value or to test the parameters.

Command Syntax: AT+CGMR

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CGMR | *get software version* |
| GSM to application | 300_D250 641680 012099 18:10<br>OK | *Software release 3.00 generated on the 20st of January 1999* |

### 4.1.4 Product Serial Number +CGSN

This command allows the user application to know the IMEI of the modem.

It is only a read command.
There is no possibility to set a value or to test the parameters.

Command Syntax: AT+CGSN

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CGSN | *Request IMEI* |
| GSM to application | 135790248939<br>OK | *IMEI present in E2PROM* |
| Application to GSM | AT+CGSN | *Request IMEI* |
| GSM to application | +CME ERROR: 22 | *IMEI not found in E2PROM* |

### 4.1.5 Select TE character set +CSCS

This commands informs the ME which character set is used by the TE.

The ME is then able to convert each character of entered or displayed string.

This function is used to send, read or write short messages.

It supports as well the set, read and test syntax.

Command Syntax: AT+CSCS=<char. set>
AT+CSCS?
AT+CSCS=?

Parameters: <char. set>
this is the name of the ANSI character set to be used by the modem.
Possible values are:
GSM for the default GSM character set
PCCP437 for the standard PC character set

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CSCS="GSM" | *GSM default alphabet* |
| GSM to application | OK | *Command valid* |
| Application to GSM | AT+CSCS="PCCP437" | *PC character set Code Page 437* |
| GSM to application | OK | *Command valid* |
| Application to GSM | AT+CSCS? | *Read current setting* |
| GSM to application | +CSCS: "PCCP437"<br>OK | *Current character set conversion to Code Page 437 character set* |
| Application to GSM | AT+CSCS=? | *Test available character sets* |
| GSM to application | +CSCS: ("GSM","PCCP437")<br>OK | *GSM default alphabet or PC character set Code Page 437* |

### 4.1.6 Request IMSI +CIMI

This command is used to read the IMSI (International Mobile Subscriber Identity) of the SIM card. The PIN should be entered (if needed) before reading the IMSI.

Command syntax: AT+CIMI

Response syntax: <IMSI>

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CIMI | *Read the IMSI* |
| GSM to application | 208200120320598 | *IMSI value (15 digits), starting with MCC (3 digits) / MNC (2 digits, 3 for PCS 1900)* |

See appendice annexe_ref for MCC / MNC description.

### 4.1.7 Card Identification +CCID

This command instructs the module to read the EF-CCID file on the SIM card.

Command syntax: AT+CCID

Response syntax: +CCID: <id>

In case of absent EF-CCID file on the SIM, the +CCID will not be sent. But the OK will be present.

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CCID | *get card id* |
| GSM to application | +CCID: "123456789AB111213141"<br>OK | *EF-CCID is present, hexadecimal format* |
| Application to GSM | AT+CCID? | *get current value* |
| GSM to application | +CCID: "123456789AB111213141" | *Same result as +CCID* |
| Application to GSM | AT+CCID=? | *get possible value* |
| GSM to application | OK | *no parameter but this command is valid* |

### 4.1.8 Capabilities list +GCAP

This command gives the complete capabilities list.

Command syntax: AT+GCAP

Example:

| | | |
|---|---|---|
| Application to GSM | AT+GCAP | *Get capabilities list* |
| GSM to application | +GCAP: +CGSM +FCLASS<br>OK | *Supports GSM commands and FAX* |

### 4.1.9 Repeat last command A/

Only A/ command can not be repeated. This command only repeats the last valid command, that means the result of the previous command was not an error.

Command syntax: A/

Example:

| | | |
|---|---|---|
| Application to GSM | A/ | *Repeat last command* |

### 4.1.10 Power off +CPOF

This **specific** command stops the GSM software stack and then the hardware layer. The AT+CFUN=0 command is equivalent to +CPOF

Command syntax: AT+CPOF

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CPOF | *stop GSM stack* |
| GSM to application | OK | *Command valid* |

### 4.1.11 Set phone functionality +CFUN

This command selects the level of functionality in the mobile station.

Command syntax: AT+CFUN=<L>

Parameters: <L>
id to be set as described below.

When the application wants to stop the module to make a power off, or if the application wants to force the module to execute an IMSI DETACH procedure, then it has to send:

AT+CFUN=0 *(same as AT+CPOF)*

This command executes an IMSI DETACH and makes a backup of some internal parameters in the SIM and the EEPROM. Then no more access to the SIM card is possible.

If the mobile is not powered off after this command, it shall received another command to re-start the whole GSM process.

If the mobile is turned off after this command, then the power on will automatically execute the start of the whole GSM process.

When the application wants to re-start the module (after having done a AT+CFUN=0 command, and without having cut the power supply), it has to send:

AT+CFUN=1

This command starts again all the GSM stack and GSM functionality, a complete software reset is done. All parameters are reset to their previous E2P value if AT&W was not used.

If you write entries in phonebook (+CPBW) and then reset the module directly (AT+CFUN=1, without any AT+CFUN=0 before), some entries may not be written (SIM task did not have enough time to write the entries in SIM card)

Also, the OK response will be sent at the last defined baud rate defined by +IPR command. With autobauding the response can be at a different baud rate, so it is better to save the defined baud rate with AT&W before directly send the AT+CFUN=1 command.

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CFUN? | Ask for current functionality level |
| GSM to application | +CFUN: 1<br>OK | Full functionality |
| Application to GSM | AT+CFUN=0 | Set minimum functionality, IMSI detach procedure |
| GSM to application | OK | Command valid |
| Application to GSM | AT+CFUN=1 | Set the full functionality mode with a complete software reset |
| GSM to application | OK | Command valid |

### 4.1.12 Phone activity status +CPAS

This command returns the activity status of the mobile.

Command syntax: AT+CPAS

Response syntax: <state>
with the following values:
0 ready (allow commands from TA/TE)
1 unavailable (does not allow cmds)
2 unknown
3 ringing (ringer is active)
4 call in progress
5 asleep (low functionality)

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CPAS | *Current activity status* |
| GSM to application | +CPAS: 4<br>OK | *4: call in progress* |

### 4.1.13 Report Mobile Equipement errors +CMEE

This command disables or enables the use of result.

Command syntax: AT+CMEE=<state>

Response syntax: +CME ERROR: <err>
or
+CMS ERROR: <err>

where <err> for CME and CMS is respectively described in appendices annexe_ref and annexe_ref.

Parameters: <state>
where state activates or disables the use of result codes:
0 disables the result codes
1 activates the result codes

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CMEE=0 | Disable ME error reports, use only « ERROR » |
| GSM to application | OK | |
| Application to GSM | AT+CMEE=1 | Enable «+CME ERROR: <err>» or «+CMS ERROR: <err>» |
| GSM to application | OK | |

### 4.1.14 Extended error report +CEER

If the last call set up (originating or answering) fails, this command gives the reason of the call release.

Command syntax: AT+CEER

Response syntax: +CEER: Error <err>
<err> is the error reason respecting the ETSI recommendations GSM 04.08.

Example:

| | | |
|---|---|---|
| Application to GSM | ATD123456789; | Outgoing voice call |
| GSM to application | NO CARRIER | |
| Application to GSM | AT+CEER | Ask for reason of release |
| GSM to application | +CEER: Error 38<br>OK | 38: "Network out of order" |

The cause information element from GSM 04.08 is given below in chapter chapter_ref.

## 4.2 Call Control commands

### 4.2.1 Dial command D

The ATD command is used to establish a speech, data or fax call.

Direct dialling from a phonebook location (stored in SIM card) can be done.

It is allowed to momentarily override the CLIR supplementary service subscription for the current call.

Command syntax:
ATD <Numb> [I / i] [;]
ATD> <PhbStr> [I / i] [;]
ATD> <mem> <n> [I / i] [;]
ATD> <PhbIndex> [I / i] [;]

Parameters:

<Numb>
is the called phone number.

<PhbStr>
is the registered name of a correspondent stored in the phone book.

<mem>
is a way to directly dial from a phonebook number and can take the values "SM", "FD" or "ON", see +CPBS command.
<n>
is the index of the phonebook entry to be dialled.

<PhbIndex>
for calling <index> from the selected phonebook (see +CPBS command).

I (upper case "i")
to restrict CLI presentation (invocation)

i
to allow CLI presentation (suppression)

;
to issue a voice call.

Response syntax:

The answer to this command is the following:

| Verbose result code | Numeric (V0 set) | Description |
|---|---|---|
| OK | 0 | if the call succeeds, for voice call only. |
| CONNECT <speed> | 10,11,12,13,14,15 | if the call succeeds, for data calls only, <speed> takes the value negotiated by the GSM module. |
| BUSY | 7 | if the called party is in communication. |
| NO ANSWER | 8 | if no hang up is detected after a fixed network time-out. |
| NO CARRIER | 3 | Call set up failed or remote user release. |
| +CME ERROR: 3 | as verbose | AOC mode without credit left, a call is already active, FDN restricted mode. |

See chapter chapter_ref for the description of all numeric result codes (ATV0).

Example:

For a data or fax call, the application sends to the GSM module the following ASCII string: (the bearer has to be selected before with the +CBST command)

ATD1234 Calling number 1234 (data or fax).

For a voice call, the application sends to the GSM module the following ASCII string: (the bearer may be selected before, if not a default bearer is used)

ATD5678; Calling number 5678 (voice call).

Please, notice that in case of an international number, the local international prefix has not to be set (usually 00) but need to be replaced by the '+' character. That is to establish a voice call to the Wavecom company from another country, the AT command shall* be:

ATD+33146290800; Calling Wavecom from Germany (for example).

Dialling from a phonebook location (stored in SIM card) can be done with the following command:

ATD> 5; To call (voice call) the 5th entry from the selected phonebook (through +CPBS command) .

ATD> "BILL"; To call "BILL" (voice call) from the selected phonebook.

ATD> FD 1 To call (data or fax call) the 1st entry from the "FD" phonebook (see +CPBS command).

| | | |
|---|---|---|
| Application to GSM | AT+CPBS? | Which phonebook is selected ? |
| GSM to application | +CPBS:"FD",5,10 | FDN phonebook is selected, 5 locations are used and 10 locations are available. |
| Application to GSM | ATD>SM6; | Voice call index 6 from ADN phonebook |
| GSM to application | OK | Call succeeds |

When FDN phonebook has been locked only the numbers beginning with the digits of FDN phonebook entries can be dialled.

For example, if "014629" is written in the FDN phonebook all the phone numbers beginning with these 6 digits can be called.

An outgoing call attempt could be refused if the AOC service is active and the credit is expired (+CME ERROR: 3). The same applies when trying to make a call while in communication, multiple calls are not managed in this release.

### 4.2.2 Hang-Up command H

This command is used by the application to disconnect the remote user. The application sends:

| | | |
|---|---|---|
| Application to GSM | ATH | *ask for disconnection* |
| GSM to application | OK | *even if there is no communication established* |

* Notice that some country can have particular numbering rules for their GSM handset numbering.

### 4.2.3 Answer a call A

When the GSM module receives a call, it set the RingInd signal and sends to the application the ASCII string “RING” or “+CRING: <type>” if cellular result code (+CRC) is enabled. Then it waits for the application to accept the call.

| | | |
|---|---|---|
| GSM to application | RING | *Incoming call* |
| Application to GSM | ATA | *Answer to this incoming call* |
| GSM to application | OK | *Call accepted* |
| Application to GSM | ATH | *Disconnect call* |
| GSM to application | NO CARRIER | *Call disconnected* |

### 4.2.4 Remote disconnection

This message is used by the GSM module to indicate to the application that the communication has been released by the remote user.
The GSM module sends "NO CARRIER" to the application, and set the DCD signal.
Also, in case AOC, the module can stop the communication if the credit is over (release cause 68 with +CEER command)

### 4.2.5 DTMF signals +VTD, +VTS

The GSM module offers the user application to send DTMF tones. One command shall be used for defining the duration of the tones (default value is 70 ms), the other for sending the Tones.
For defining the duration, the application uses:

AT+VTD=<n> where <n>*100 gives the duration in ms.

| | | |
|---|---|---|
| Application to GSM | AT+VTD=1 | for defining 100 ms tone duration |
| GSM to application | OK | Command valid |
| Application to GSM | AT+VTD=100000 | |
| GSM to application | +CME ERROR: 3 | if the duration is too long (the limit is to define for each application) |
| Application to GSM | AT+VTD=0 | for setting the manufacturer default value |
| GSM to application | OK | |

For sending DTMF tones (only when a call is active!), the application uses:

AT+VTS=<Tone> where <Tone> is in {0-9,*,#,A,B,C,D}

| | | |
|---|---|---|
| Application to GSM | AT+VTS=A | |
| GSM to application | OK | command valid |
| Application to GSM | AT+VTS=11 | |
| GSM to application | +CME ERROR: 4 | if the <Tone> is wrong |
| Application to GSM | AT+VTS=4 | |
| GSM to application | +CME ERROR: 3 | if there is no communication |

Example: to send the Tone sequence 13#, the application shall send:

AT+VTS=1;+VTS=3;+VTS=#
OK

### 4.2.6 Redial last number ATDL

This command is used by the application to redial the last number used in the ATD command. The last dialled number is displayed followed by “;” for speech calls only

| | | |
|---|---|---|
| Application to GSM | ATDL | *redial last number* |
| GSM to application | 0146290800;<br>OK | last call was a speech call<br>command valid |

### 4.2.7 Automatic answer ATS0

This S-parameter controls the automatic answering feature of the mobile.

| | | |
|---|---|---|
| Application to GSM | ATS0=2 | *Automatic answer after 2 rings* |
| GSM to application | OK | |
| Application to GSM | ATS0? | *Current value* |
| GSM to application | 002<br>OK | *always 3 characters with leading zeros* |
| Application to GSM | ATS0=0 | *no automatic answer* |
| GSM to application | OK | *command valid* |

All others S-parameters (S6,S7,S8 ...) are not implemented.

### 4.2.8 Incoming Call Bearer +CICB

Command syntax: AT+CICB= <mode>
This specific command is used for incoming call type when no incoming bearer is given (single numbering scheme).
<mode> values:

0: Data
1: Fax
2: Speech

| | | |
|---|---|---|
| Application to GSM | AT+CICB=1 | If no incoming bearer, force a fax call |
| GSM to Application | OK | Command accepted |
| Application to GSM | AT+CICB=2 | If no incoming bearer, force a speech call |
| GSM to Application | OK | Command accepted |
| Application to GSM | AT+CICB? | Interrogate value |
| GSM to Application | +CICB: 2 | Default incoming bearer: speech call |
| Application to GSM | AT+CICB=? | Test command |
| GSM to Application | +CICB: (0-2) | Speech, data or fax default incoming bearer |

### 4.2.9 Gain control +VGR, +VGT

This command shall be used by the application to tune the receive gain of the speaker and transmit gain of the microphone. The application shall send

| AT+VGR=<val> | for the receive gain | AT+VGT=<val> | for the transmit gain |
|---|---|---|---|
| 0 to 15 | +6 db | 0 to 31 | +14 db |
| 16 to 31 | +4 db | 32 to 63 | +17 db |
| 32 to 47 | +2 db | 64 to 95 | +20 db |
| 48 to 63 | 0 db | 96 to 127 | +23 db |
| 64 to 79 | -2 db | 128 to 159 | +26 db |
| 80 to 95 | -4 db | 160 to 191 | +29 db |
| 96 to 111 | -6 db | 192 to 223 | +32 db |
| 112 to 127 | -8 db | 224 to 255 | +35 db |
| 128 to 143 | -10db | | |
| 144 to 159 | -12 db | | |
| 160 to 175 | -14 db | | |
| 176 to 191 | -16 db | | |
| 192 to 207 | -18 db | | |
| 208 to 223 | -20db | | |
| 224 to 239 | -22 db | | |
| 240 to 255 | -24 db | | |

16 levels for receive gain are provided and 8 levels for transmit gain.

| | | |
|---|---|---|
| Application to GSM | AT+VGR=25 | |
| GSM to application | OK | Command valid |
| Application to GSM | AT+VGT=45 | |
| GSM to application | OK | Command valid |

### 4.2.10 Microphone Mute Control +CMUT

Command syntax: AT+CMUT = <mode>

This command instructs the module to set the microphone mute or not for the active microphone (defined with+SPEAKER command). This command is only allowed during a call.
<mode> takes the following values:
0: microphone mute off.
1: microphone mute on.

| | | |
|---|---|---|
| Application to GSM | AT+CMUT=? | *Test command* |
| GSM to application | +CMUT: (0,1)<br>OK | Enable/disable mute |
| Application to GSM | AT+CMUT? | *Ask for current value* |
| GSM to application | +CMUT: 0<br>OK | Current value is OFF |
| Application to GSM | AT+CMUT=1 | *Mute ON (call active)* |
| GSM to application | OK | Command valid |
| Application to GSM | AT+CMUT? | *Ask for current value* |
| GSM to application | +CMUT: 1<br>OK | Mute is active (call active) |
| Application to GSM | AT+CMUT=0 | *Mute OFF* |
| GSM to application | OK | Command valid |

### 4.2.11 Speaker & Microphone selection +SPEAKER

This specific command is used to choose the speaker and the microphone.
The application shall send
AT+SPEAKER=<ActiveSpkMic>

| | <ActiveSpkMic> |
|---|---|
| 0 | SPEAKER ONE, MICRO ONE |
| 1 | SPEAKER TWO, MICRO TWO |

| | | |
|---|---|---|
| Application to GSM | AT+SPEAKER=0 | SPEAKER ONE and MICRO one |
| GSM to application | OK | Command valid |
| Application to GSM | AT+SPEAKER? | |
| GSM to application | +SPEAKER: 0<br>OK | SPEAKER ONE and MICRO ONE are active |

### 4.2.12 Echo Cancelation +ECHO

Command syntax: AT+ECHO= <mode>, [<Taps>,<ConvTh>,<DbtS>, <FarS>, <EcDelay> ]

This specific command is used to activate, deactivate or configure the Echo Cancelation function.

Defined Values
<mode>:
0: Deactivate Echo
1: Activate Echo
2: Configure the echo cancelation (automatically stored in E2P)

<Taps>: Number of taps of the adaptive filter. This value is directly related to the length of the longest echo path (240 words = 30 ms echo path delay). Values from 1 to 192, default is 160
<ConvTh>: Threshold for convergence parameter. This specifies the level of energy computed on <EcDelay> samples needed to assume algorithm convergence. A low value provides a high convergence and a high value a high stability. Values from 0 to 45, default is 12.
<DbtS>: Double talk sensitivity. This reflect the ratio between received and sent energy to assume double talk occured. A low value provides a high sensibility and a high value a low one. Values from 0 to 10, default is 5.
<FarS>: Far end speaker detection - algorithm adaptation. This is related to then energy level needed on the receive path to allow filter taps adaptation. If <FarS> = 0 the algorithm will always adjust the filter. Values from 0 to 1000, default is 512.
<EcDelay>: Number of samples used to compute energy for algorithm convergence evaluation. Values from 1 to 30, default is 10

### 4.2.13 SideTone modification +SIDET

Command syntax: AT+SIDET=<val1>,<val2>
This specific command is used to get an echo of the voice in the speaker (to hear what is said in the speaker).

| <val2> | Level | <val1> | presence |
|---|---|---|---|
| 0 | 0 db | 0 | SideTone is disabled |
| 1 | - 6 db | 1 | SideTone is enabled |
| 2 | -12 db | | |
| 3 | -18 db | | |

| | | |
|---|---|---|
| Application to GSM | AT+SIDET=1,0 | |
| GSM to application | OK | Command valid |
| Application to GSM | AT+SIDET? | Current value |
| GSM to application | +SIDET: 1,0<br>OK | Command valid |

## 4.3 Network service related commands

### 4.3.1 Signal Quality +CSQ

This command shall be used to know the *received signal strength indication* (<rssi>) and the *channel bit error rate* (<ber>) with or without any SIM card inserted.

<rssi>:
0 : -113 dBm or less
1 : -111 dBm
2...30 : -109 to -53 dBm
31 : -51dBm or greater
99 : not known or not detectable

<ber>:
0...7 : as RXQUAL values in the table GSM 05.08
99 : not known or not detectable

| | | |
|---|---|---|
| Application to GSM | AT+CSQ | |
| GSM to application | +CSQ: <rssi>,<ber><br>OK | <rssi> and <ber> as defined above |

### 4.3.2 Operator selection +COPS

To select the operator, three possibilities exist:
1- The mobile enters the *manual mode*, and then try to find an operator which is indicated by the application. If it finds and registers correctly, then the mobile stays in idle mode.
2- The mobile enters the *automatic mode*, and then try to find the home operator. If it finds and registers correctly, then the mobile stays in idle mode ; if not, the mobile search automatically another network.
3- The mobile enters the *manual/automatic mode,* and the try to find an operator which is indicated by the application (like in manual mode) . If this attempt fails the *automatic mode is entered.*
To force an attempt to select and register a network operator, the application must send the following command:
Command syntax: AT+COPS=<mode>, [<format> [ , <oper> ] ]
Response syntax: OK or +CME ERROR: <err>
The parameters values are the following ones:
<mode>:
0: automatic (default value)
1: manual
3: set only <format>
4: manual / automatic (<oper> shall be present), if automatic selection fails, automatic mode is entered.

<format>: format of <oper> field
0: long format alphanumeric <oper>
2: numeric <oper> (default value)

<oper>: operator identifier (MCC/MNC in numeric format only for operator selection)., long alphanumeric format can be up to 16 characters long (see appendice 16.10**}** for operator names description, field is "Name")

| | | |
|---|---|---|
| Application to GSM | AT+COPS? | Ask for current plmn |
| GSM to application | +COPS: 0,2,20801<br>OK | Home PLMN is France telecom Itineris |
| Application to GSM | AT+COPS=? | Ask for PLMN list |
| GSM to application | +COPS: (2,20801), (0,20810)<br>OK | Home PLMN is France Telecom<br>SFR network has been seen |
| Application to GSM | AT+COPS=1,2,20810 | Ask for registration on SFR network |
| GSM to application | +CME ERROR: 3 | Failed |
| Application to GSM | AT+COPS=1,1,20810 | Ask for registration on SFR network |
| GSM to application | +CME ERROR: 4 | Wrong parameters |
| Application to GSM | AT+COPS=0,2 | Ask for registration on home network |
| GSM to application | OK | Succeed |
| Application to GSM | AT+COPS=3,0 | Ask for setting alphanumeric format |
| GSM to application | OK | Succeed |
| Application to GSM | AT+COPS? | Ask for current plmn |
| GSM to application | +COPS: 0,0,"F Itineris"<br>OK | Home PLMN is France telecom Itineris |
| Application to GSM | AT+COPS=1,0,"F SFR" | Ask for registration on SFR network |
| GSM to application | +CME ERROR: 3 | Failed |
| Application to GSM | AT+COPS=4,0,"F SFR" | Ask for registration on SFR network in manual/automatic mode |
| GSM to application | OK | Command succeed |
| Application to GSM | AT+COPS? | Ask for current plmn |
| GSM to application | +COPS: 0,0,"F Itineris"<br>OK | Home PLMN is France telecom Itineris !<br>So the attempt to register on SFR Network has failed but the automatic selection on Home PLMN has succeed. |

### 4.3.3 Network registration +CREG

This command is used by the application to know the registration status of the mobile.
Command syntax: AT+CREG= <mode>
Response syntax: +CREG: <mode>, <stat> [ ,<lac>,<ci> ]

for AT+CREG? command only

<mode>
0: Disable network registration unsolicited result code (default)
1: Enable network registration code result code +CREG: <stat>
2: Enable network registration and location information unsolicited result code +CREG: <stat>,<lac>,<ci> if there is a change of the network cell.

<stat>
0: not registered, ME is not currently searching a new operator
1: registered, home network
2: not registered, ME currently searching a new operator to register to
3: registration denied
4: unknown
5: registered, roaming

<lac>: string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 193 in decimal)

<ci>: string type; two byte cell ID in hexadecimal format

| | | |
|---|---|---|
| Application to GSM | AT+CREG? | |
| GSM to application | +CREG: <mode>,<stat><br>OK | as defined before |
| Application to GSM | AT+CREG=<mode> | disable/enable network registration unsolicited result code |
| GSM to application | OK | command valid |
| Application to GSM | AT+CREG=? | |
| GSM to application | +CREG: (0-2) | 0,1,2 <mode> values are supported |

### 4.3.4 Read operator name+WOPN

This specific command returns the operator name in alphanumeric format when given the numeric format.
Command syntax: AT+WOPN=<format>,<NumOper>
Response syntax: +WOPN: <format>,<AlphaOper>
<format> is the required format but only long alphanumeric format is currently supported ( value 0 ).
<NumOper> is the operator in numeric format.
<AlphaOper> is the operator in long alphanumeric format (see appendice 6.9 for operator names description)

| | | |
|---|---|---|
| Application to GSM | AT+WOPN=? | *Test command* |
| GSM to application | OK | |
| Application to GSM | AT+WOPN=0,20801 | *Give an operator in numeric format* |
| GSM to application | +WOPN: 0,"F Itineris"<br>OK | *Alphanumeric answer* |
| Application to GSM | AT+WOPN=0,99999 | *Give a wrong operator* |
| GSM to application | +CME ERROR: 22 | *Not Found* |

### 4.3.5 Preferred operator list +CPOL

This command is used to edit the SIM preferred list of networks.
Command syntax: AT+CPOL= [ <index> ][ , <format> [ , <oper> ] ]

The different possibilities are:
AT+CPOL = <index> to delete an entry.
AT+CPOL = , <format> to set the format used by the read command (AT+CPOL?).
AT+CPOL = , <format>, <oper> to put <oper> in the next free location.
AT+CPOL = <index> , <format> , <oper> to write <oper> in the <format> at the <index> .
The supported format are the numeric (value 2) and the long format alphanumeric (value 0).
Please notice that the default format for read command is the numeric one (value 2).
The length of this list is limited to 8 entries .

| | | |
|---|---|---|
| Application to GSM | AT+CPOL? | *Ask for preferred list of networks* |
| GSM to application | +CPOL: 1,2,26201<br>+CPOL: 6,2,20810<br>OK | *Preferred list of networks in numeric format* |
| Application to GSM | AT+CPOL=,0 | *Select long alphanumeric format* |
| GSM to application | OK | |
| Application to GSM | AT+CPOL? | *Ask for preferred list of networks* |
| GSM to application | +CPOL: 1,0,"D1-TELEKOM"<br>+CPOL: 6,0,"F SFR"<br>OK | *Preferred list of networks in long alphanumeric format* |
| Application to GSM | AT+CPOL=7,2,20801 | *Add a network to the list* |
| GSM to application | OK | |
| Application to GSM | AT+CPOL? | *Ask for preferred list of networks* |
| GSM to application | +CPOL: 1,0,"D1-TELEKOM"<br>+CPOL: 6,0,"F SFR"<br>+CPOL: 7,0,"F Itineris"<br>OK | *Preferred list of networks in long alphanumeric format* |
| Application to GSM | AT+CPOL=7 | *Delete 7th location* |
| GSM to application | OK | |
| Application to GSM | AT+CPOL? | *Ask for preferred list of networks* |
| GSM to application | +CPOL: 1,0,"D1-TELEKOM"<br>+CPOL: 6,0,"F SFR"<br>OK | *Preferred list of networks in long alphanumeric format* |
| Application to GSM | AT+CPOL=8,2,77777 | *Add an inexistent network to the list* |
| GSM to application | OK | |
| Application to GSM | AT+CPOL? | *Ask for preferred list of networks* |
| GSM to application | +CPOL: 1,0,"D1-TELEKOM"<br>+CPOL: 6,0,"F SFR"<br>+CPOL: 8,2,77777<br>OK | *Preferred list of networks in long alphanumeric format but 8th entry is unknown so the module edits it in the numeric format.* |

## 4.4 Security commands

### 4.4.1 Enter PIN +CPIN

This command is used to enter ME passwords (CHV1 / CHV2 / PUK1 / PUK2...) which are needed before any other functionality of the ME can be used. The CHV1/CHV2 length is between 4 and 8 digits, the PUK1/PUK2 length is 8 digits only.
If the user application try to establish an outgoing call before having validated the SIM PIN code (CHV1), then the GSM module will refuse the "ATD" command with a "+CME ERROR: 11" (SIM PIN required).
It's up to the application to validate the PIN after each reset or power on if the PIN was enabled. The application shall therefore use the command:
AT+CPIN=<pin>

| | | |
|---|---|---|
| Application to GSM | AT+CPIN=1234 | *Enter PIN* |
| GSM to application | OK | *PIN code is correct* |
| Application to GSM | AT+CPIN=5678 | *Enter PIN* |
| GSM to application | +CME ERROR: 3 | *Operation not allowed, PIN previously entered* |

After 3 unsuccessful codes, the PUK will then be required. The PUK validation forces the user to enter as a second parameter a new PIN code which will be the new PIN code if the PUK validation succeeds. The CHV1 is then enabled if the PUK1 is correct. The application shall therefore use the command:
AT+CPIN=<Puk>,<NewPin>

| | | |
|---|---|---|
| Application to GSM | AT+CPIN=00000000,1234 | enter PUK and new PIN |
| GSM to application | +CME ERROR: 16 | Incorrect PUK |
| Application to GSM | AT+CPIN=12345678,1234 | enter PUK and new PIN, 2nd attempt |
| GSM to application | OK | PUK correct, new PIN stored |

To know which code has to be entered (or not), the following interrogation command can be used:
AT+CPIN?
The possible responses are:

| | |
|---|---|
| +CPIN: READY | ME is not pending for any password |
| +CPIN: SIM PIN | CHV1 is required |
| +CPIN: SIM PUK | PUK1 is required |
| +CPIN: SIM PIN2 | CHV2 is required |
| +CPIN: SIM PUK2 | PUK2 is required |
| +CPIN: PH-SIM PIN | SIM lock (phone-to-SIM) is required |
| +CPIN: PH-NET PIN | Network personnalisation is required |
| +CME ERROR: <err> | SIM failure (13) absent (10) etc... |

Please note that in this case the mobile does not finish its response with the OK string.
The response +CME ERROR: 13 (SIM failure) is returned after 10 unsuccessful PUK presentations. The SIM card is then out of order and shall be replaced by a new one.

Example: 3 failed PIN validations + 1 successful PUK validation

| | |
|---|---|
| AT+CPIN?<br>+CPIN: SIM PIN | Read the PIN status<br>The GSM module requires SIM PIN |
| AT+CPIN=1235<br>+CME ERROR: 16 | First attempt to enter a SIM PIN<br>Bad PIN |
| AT+CPIN=1236<br>+CME ERROR: 16 | Second attempt<br>Bad PIN |
| AT+CPIN=1237<br>+CME ERROR: 16 | Third attempt<br>Bad PIN |
| AT+CPIN?<br>+CPIN: SIM PUK | Read PIN state<br>The GSM module requires PUK |
| AT+CPIN=99999999,5678<br>OK | The PUK is entered, the new PIN shall be 5678 PUK validation is OK.<br>New Pin is 5678 |
| AT+CPIN?<br>+CPIN: READY | Read PIN state<br>GSM module is ready |

If the user try to do something which requires PIN2 (CHV2) the GSM module will refuse his action with a "+CME ERROR: 17" (SIM PIN2 required). Then the GSM module is waiting SIM PIN2 to be given.
Of course if SIM PIN2 is blocked , SIM PUK2 is required instead of SIM PIN2.
For instance, the GSM module needs PIN2 to write in the fixed dialling phonebook (FDN) , so if SIM PIN2 authentication has not been done during the current cession the SIM PIN2 is required:

| | | |
|---|---|---|
| Application to GSM | AT+CPBS="FD" | *Choose FDN* |
| GSM to application | OK | |
| Application to GSM | AT+CPBW=5,"01290917",129,"Jacky" | *write in FDN at location 5* |
| GSM to application | +CME ERROR:17 | *SIM PIN2 is required* |
| Application to GSM | AT+CPIN? | |
| GSM to application | SIM PIN2 | *SIM PIN2 is required* |
| Application to GSM | AT+CPIN=5678 | *Enter SIM PIN2* |
| GSM to application | OK | |
| Application to GSM | AT+CPBW=5,"01290917",129,"Jacky" | *write in FDN at location 5* |
| GSM to application | OK | *Now writing in FDN is allowed* |

Please note that the GSM module ask only once PIN2 or PUK2, so if they aren't entered right, the next +CPIN? command will return "+CPIN: READY".
Remark
In the way Application to GSM, an "h" character shall be added before the PIN value if cyphering mode (with D.E.S algorithm ) is on. See +EXPKEY command.
Same remark for +CLCK and +CPWD commands.

### 4.4.2 Enter PIN2 +CPIN2

This specific command is used to validate the PIN2 code (CHV2), or to validate the PUK2 code (UNBLOCK CHV2) and to define a new PIN2 code. Of course +CPIN command allows to validate PIN2 or PUK2 codes but only when the last executed command resulted in PIN2 authentification failure.
The PIN2 length is between 4 and 8 digits, the PUK2 length is 8 digits only.
AT+CPIN2=<pin2>

| | | |
|---|---|---|
| Application to GSM | AT+CPIN2=1234 | *enter PIN2* |
| GSM to application | OK | *PIN2 code is correct* |
| Application to GSM | AT+CPIN2=5678 | *enter PIN2* |
| GSM to application | +CME ERROR: 3 | *operation not allowed, PIN2 previously entered* |

After 3 unsuccessful codes, the PUK2 will then be required. The PUK2 validation forces the user to enter as a second parameter a new PIN2 code which will be the new PIN2 code if the PUK1 validation succeeds. The application shall therefore use the command:
AT+CPIN2=<puk2>,<NewPin2>

| | | |
|---|---|---|
| Application to GSM | AT+CPIN2=00000000,1234 | *enter PUK2 and new PIN2* |
| GSM to application | +CME ERROR: 16 | *Incorrect Password (PUK2)* |
| Application to GSM | AT+CPIN2=12345678,1234 | *enter PUK2 and new PIN1, 2nd attempt* |
| GSM to application | OK | *PUK2 correct, new PIN2 stored* |

To know which code has to be entered (or not), the following interrogation command can be used:
AT+CPIN2?
The possible responses are:

| | |
|---|---|
| +CPIN2: READY | No PIN2 is needed |
| +CPIN2: SIM PIN2 | PIN2 is required |
| +CPIN2: SIM PUK2 | PUK2 is required |
| +CME ERROR: <err> | Absent (10) etc... |

### 4.4.3 PIN remaining attempt number +CPINC

This **specific** command instructs the module to display the number of valid tries for PIN1 (CHV1), PIN2 (CHV2), PUK1 (UNBLOCK CHV1) and PUK2 (UNBLOCK CHV2) identifiers.

Command syntax: AT+CPINC
Response syntax: +CPINC: <n1>,<n2>,<k1>,<k2>
<n1>, <n2> are the remaining tries of PIN1, PIN2 (0 = blocked, 3 max)
<k1>, <k2> are the remaining tries of PUK1, PUK2 (0 = blocked, 10 max)

To make it running, the card should be present at the initialisation time, in the opposite case, an error will be sent (+CME ERROR: 10).

| | | |
|---|---|---|
| Application to GSM | AT+CPINC | *Ask remaining tries* |
| GSM to application | +CPINC: 2,3,10,10 | *First CHV1 attempt was a failure* |
| Application to GSM | AT+CPINC? | *Ask current values* |
| GSM to application | +CPINC: 2,3,10,10 | *First attempt was a failure* |
| Application to GSM | AT+CPINC=? | *Ask possible values* |
| GSM to application | OK | |

### 4.4.4 Facility lock +CLCK

This command shall be used by the application to lock, unlock or interrogate a ME or network facility <fac>.
Command syntax: AT+CLCK= <fac>,<mode>[,<passwd>[,<class>] ]
Response syntax: +CLCK: <status> [ ,<class1> ]
<CR><LF>+CLCK: <status>,<class2>
[ ... ] ]

The following <fac> values are supported:

"PS": SIM lock facility with a 8 digits password.

"SC": PIN enable (<mode> = 1) / disable (<mode> = 0)

"AO": BAOC (Barr All Outgoing Calls)

"OI": BOIC (Barr Outgoing International Calls)

"OX": BOIC-exHC (Barr Outg. Internat Calls except to Home Country)

"AI": BAIC (Barr All Incoming Calls)

"IR": BIC-Roam (Barr Inc. when Roaming outside Home Country)

"AB": All Barring services

"AG": All outGoing barring services

"AC": All inComing barring services

"PN": Network lock with a 8 digits password (NCK).

"FD": SIM Fixed Dialling Numbers (FDN) memory feature (PIN2 is required as <password>)

<mode>
0: unlock the facility
1: lock the facility
2: query status

<class>: A facility status can be changed for only one class, or for all classes (7 or omitted).
1: Voice (telephony)
2: Data (refer to all bearer services)
4: Fax (facsimile services)
8: Short Message service
7: equal to all classes (Default value)

Any attempt to combine different classes will result in activation / desactivation / interrogation of all classes.
The password maximum length is given with the AT+CPWD=? command.

| | | |
|---|---|---|
| Application to GSM | AT+CLCK="SC",1,1234 | *enable PIN* |
| GSM to application | OK | *PIN was right* |
| Application to GSM | AT+CLCK? | *Read PIN status* |
| GSM to application | +CLCK: ("PS", 0),("SC", 1), ("PN",0), ("FD",0)<br>OK<br>(**no longer supported** in GSM 07.07) | *PIN is enabled, no SIM lock, no network lock, no information on Call barring* |
| Application to GSM | AT+CLCK="SC",0,5555 | *disable PIN* |
| GSM to application | +CME ERROR: 16 | *PIN was wrong* |
| Application to GSM | AT+CPIN=1234 | *Enter PIN* |
| GSM to application | OK | *PIN was good* |
| Application to GSM | AT+CLCK= ? | *request supported facilities* |
| GSM to application | +CLCK: ("PS","SC","AO","OI", "OX", "AI", "IR","AB", "AG","AC", "FD", "PN")<br>OK | *supported facilities* |
| Application to GSM | AT+CLCK="PN",1,12345678 | *Activate network lock* |
| GSM to application | OK | *Network lock activated* |
| Application to GSM | AT+CLCK="AO",1,1234,2 | *Activate All Outgoing Calls Barring for Data Calls* |
| GSM to application | OK | *Call Barring is activate* |
| Application to GSM | AT+CLCK="AO",2 | *Query BAOC status* |
| GSM to application | <CR><LF> +CLCK: 1,2<br>OK | *BAOC activate for Data calls only* |

### 4.4.5 Change password +CPWD

Command syntax: AT+CPWD= <fac>, <oldpwd>, <newpwd>
This command shall be used by the application to change a password (PIN, call barring, NCK...). The facility values (<fac>) are the same as for +CLCK command, with a "P2" facility to manage SIM PIN2.
For the network lock ("PN"), the unlock is forbidden after 10 failed attempts to disable (unlock) the network lock with an incorrect password.

| | | |
|---|---|---|
| Application to GSM | AT+CPWD=? | *Possible values* |
| GSM to application | +CPWD: ("PS", 8),("SC", 8),("AO", 4), ("OI", 4), ("OX", 4),("AI", 4),("IR", 4), ("AB", 4), ("AG", 4), ("AC", 4),<br>("P2", 8), ("FD", 8), ("PN", 8)<br>OK | *CHV1/CHV2 must be on 8 digits maximum (4 min)*<br>*For Call Barring, 4 digits maximum* |
| Application to GSM | AT+CPWD="SC",1234,5555 | *change PIN* |
| GSM to application | OK | *PIN iwas good* |
| Application to GSM | AT+CPWD="SC",1234,5555 | *Change PIN* |
| GSM to application | +CME ERROR: 16 | *PIN was wrong* |
| Application to GSM | AT+CPIN=5555 | *Enter PIN* |
| GSM to application | OK | *PIN was good* |
| Application to GSM | AT+CPWD="PN",12345678,00000000 | *change NCK* |
| GSM to application | OK | *NCK changed for net lock* |

## 4.5 Phonebook commands

### 4.5.1 Select phonebook memory storage +CPBS

This command selects phonebook memory storage. The available phonebooks are the ADN (SIM), FDN (SIM fixdialling, restricted phonebook), and MSISDN (SIM own numbers) phonebooks.

| | | |
|---|---|---|
| Application to GSM | AT+CPBS= "SM" | *Select ADN phonebook* |
| GSM to application | OK | *ADN phonebook is selected* |
| Application to GSM | AT+CPBS=? | *Possible values* |
| GSM to application | +CPBS: ("SM","FD","ON")<br>OK | *ADN, FDN, MSISDN phonebooks supported* |
| Application to GSM | AT+CPBS ? | *Status* |
| GSM to application | +CPBS: "SM",10,20<br>OK | *ADN phonebook selected, 10 used locations, 20 locations available* |

The ADN phonebook could not be selected is FDN is active.

### 4.5.2 Read phonebook entries +CPBR

This command returns phonebook entries for a location range from the current phonebook memory storage selected with +CPBS.

| | | |
|---|---|---|
| Application to GSM | AT+CPBR=? | *Test command* |
| GSM to application | +CPBR: (1-50), 20,10<br>OK | *50 locations (from 1 to 50), max length of 20 for phone 10 characters max for the associated text* |
| Application to GSM | AT+CPBR=12,14 | *Read entries from 12 to 14* |
| GSM to application | +CPBR: 12,"112",129,"Emergency"<br>+CPBR: 13,"+331290909",145, "Fred"<br>+CPBR: 14, "0146290808",129, "Zazi"<br>OK | *Display locations 12,13,14 with Location, Number, Type (TON/NPI), Text* |
| Application to GSM | AT+CPBR=10 | *Read entry 10* |
| GSM to application | +CPBR:10,"0146290921",129,"Rob"<br>OK | *Display location 10* |
| Application to GSM | AT+CPBR=52 | *Read entry 52 (wrong)* |
| GSM to application | +CME ERROR: 21 | *Invalid index* |

### 4.5.3 Find phonebook entries +CPBF

This command returns phonebook entries which alphanumeric field start with a given string. The AT+CPBF= "" command can be used to display all phonebook entries sorted in alphabetical order.

| | | |
|---|---|---|
| Application to GSM | AT+CPBF=? | *Test command* |
| GSM to application | +CPBF: 20,10<br>OK | *max length of 20 for phone 10 characters for the text* |
| Application to GSM | AT+CPBF= "E" | *Read entries with* "E" |
| GSM to application | +CPBF: 12,"112",129,"Emergency"<br>+CPBF: 15,"+331290101",145, "Eric"<br>OK | *Display locations with text field starting with* "E" |
| Application to GSM | AT+CPBF="H" | *Read entries with* "H" |
| GSM to application | +CME ERROR: 22 | *Entry not found* |

### 4.5.4 Write phonebook entry +CPBW

This command writes phonebook entry in location number <*index*> in the current phonebook memory storage.

| | | |
|---|---|---|
| Application to GSM | AT+CPBW=? | *Test command* |
| GSM to application | +CPBW: (1-50),20,(129,145),10<br>OK | *50 locations, phone length=20, TON/NPI of 129 or 145, text length=10* |
| Application to GSM | AT+CPBW=3 | *Erase location 3* |
| GSM to application | OK | *Location 3 erased* |
| Application to GSM | AT+CPBW=5,"112",129 ,"SOS" | *Write at location 5* |
| GSM to application | OK | *Location 5 written* |
| Application to GSM | AT+CPBW=5,"01290917",129,"Jacky" | *Overwrite location 5* |
| GSM to application | OK | *Location 5 is overwritten* |
| Application to GSM | AT+CPBW=,"+33145221100",145,<br>"SOS" | *Write at the first free location* |
| GSM to application | OK | *Free location is written* |
| Application to GSM | AT+CPBW=,"0345221100",129,"SOS" | *Write at the first free location* |
| GSM to application | +CME ERROR: 20 | *Phonebook full* |
| Application to GSM | AT+CPBW=57,"112",129 ,"WM" | *Write at loc 57 (wrong)* |
| GSM to application | +CME ERROR: 21 | *Invalid index* |
| Application to GSM | AT+CPBW=7,"012345678901234567890",<br>129 ,"WAVE" | *Write at loc 7 a long Phone number (21 digits)* |
| GSM to application | +CME ERROR: 26 | *Phone too long* |
| Application to GSM | AT+CPBW=7,"0122334455",129 ,<br>"WAVECOM TEL" | *Write at loc 7 a long Text (11 characters)* |
| GSM to application | +CME ERROR: 24 | *Text too long* |

When the fixed dialling phonebook (FDN) is locked , this command is not allowed. Moreover , when FDN is unlocked , PIN2 is required to write in the FDN phonebook.
But if PIN2 authentification has been done during the current cession , +CPBW command with FDN is allowed .

| | | |
|---|---|---|
| Application to GSM | AT+CPBS=”FD” | *Choose FDN* |
| GSM to application | OK | |
| Application to GSM | AT+CPBW=5,"01290917",129,"Jacky" | *write in FDN at location 5* |
| GSM to application | +CME ERROR:17 | *SIM PIN2 is required* |
| Application to GSM | AT+CPIN? | |
| GSM to application | SIM PIN2 | *SIM PIN2 is required* |
| Application to GSM | AT+CPIN=5678 | *Enter SIM PIN2* |
| GSM to application | OK | |
| Application to GSM | AT+CPBW=5,"01290917",129,"Jacky" | *write in FDN at location 5* |
| GSM to application | OK | *Now writing in FDN is allowed* |

### 4.5.5 Phonebook phone search +CPBP

This specific command instructs the module to look in the phonebook for an item having the same phone number that defined in parameter.
Command syntax: AT+CPBP=<PhoneNumber>
<PhoneNumber> is coded like all phone numbers in GSM 07.07 or GSM 07.05 .

| | | |
|---|---|---|
| Application to GSM | AT+CPBP= "+331290101" | *Read entries with this phone number* |
| GSM to application | +CPBP: 15,"+331290101",145, "Eric"<br>OK | *Display location with this phone number* |
| Application to GSM | AT+CPBP= "+331290101" | *Read entries with this phone number* |
| GSM to application | +CPBP: 15,"+331290101",145, "Eric"<br>OK | *Display location with this phone number* |
| Application to GSM | AT+CPBP= "+331290101" | *Read entries with this phone number* |
| GSM to application | +CPBP: 15,"+331290101",145, "Eric"<br>OK | *Display location with this phone number* |
| Application to GSM | AT+CPBP= "01290101" | *Read entries with this phone number* |
| GSM to application | +CPBP: 15,"+331290101",145, "Eric"<br>OK | *Display location with this phone number* |
| Application to GSM | AT+CPBP= "0129" | *Read entries with* "H" |
| GSM to application | +CME ERROR: 22 | *Entry not found* |

### 4.5.6 Move action in phonebook +CPBN

Command syntax: AT+CPBN = <mode>

This specific command instructs the module to make a forward or a backward move in the phonebook (in alphabetical order).
<mode> may take the following values: 0 for First item, 1 for Last item, 2 for Next valid item in alphabetical order, 3 for Previous valid item in alphabetical order, 4 for Last read item and 5 for Last written item.

| | | |
|---|---|---|
| Application to GSM | AT+CPBN= ? | *Test Command* |
| GSM to application | +CPBN=<0-3> | *Possible Modes* |
| Application to GSM | AT+CPBN= 0 | *Read the first location* |
| GSM to application | +CPBN: 15,"+331290101",145, "Eric"<br>OK | *Display the first location* |
| Application to GSM | AT+CPBN=2 | *Read the next location* |
| GSM to application | +CPBN:5,"+33147658987",145, "Frank"<br>OK | *Display the second location* |
| Application to GSM | AT+CPBN=2 | *Read the next location* |
| GSM to application | +CPBN: 6,"+331290302",145, "Marc"<br>OK | *Display the third location* |
| Application to GSM | AT+CPBN=3 | *Read the previous location* |
| GSM to application | +CPBN:5,"+33147658987",145, "Frank"<br>OK | *Display the second location* |
| Application to GSM | AT+CPBN=1 | *Read the last location* |
| GSM to application | +CPBN: 6,"+331290302",145, "Marc"<br>OK | *Display the last location* |
| Application to GSM | AT+CPBN=2 | *Read the next location* |
| GSM to application | +CPBN: 15,"+331290101",145, "Eric"<br>OK | *Display the first location* |

Using mode 4 and 5 with +CPBF command and CPBW:

| | | |
|---|---|---|
| Application to GSM | AT+CPBF="Er" | *Find "Er" in phonebook* |
| GSM to application | +CPBF: 15,"+331290101",145, "Eric"<br>OK | *Display this location* |
| Application to GSM | AT+CPBN=2 | *Read the next location* |
| GSM to application | +CPBN:5,"+33147658987",145, "Frank"<br>OK | *Display the following location* |
| Application to GSM | AT+CPBF="Er" | *Find "Er" in phonebook* |
| GSM to application | +CPBF: 15,"+331290101",145, "Eric"<br>OK | *Display this location* |
| Application to GSM | AT+CPBN=4 | *Read the Last read location* |
| GSM to application | +CPBN:15,"+331290101",145, "Eric" | *Display the Last read location* |
| Application to GSM | AT+CPBW=,"0146290800",129, "WM" | *Write an item at the first free location* |
| GSM to application | OK | *No information about this location ...* |
| Application to GSM | AT+CPBN=4 | *Read the Last read location* |
| GSM to application | +CPBN:15,"+331290101",145, "Eric" | *Display the Last read location* |
| GSM to application | +CPBN: 38,"0146290800",129, "WM" | *Display the Last writen item with its location.* |
| Application to GSM | AT+CPBN=4 | *Read the Last read item* |
| GSM to application | +CPBN: 38,"0146290800",129, "WM" | *Now the last read item is the last writen item too* |

Please note that the AT+CPBN=5 command is useful after an AT+CPBW command used without a location.

### 4.5.7 Subscriber number +CNUM

This command returns the MSISDN(s) related to the subscriber.
If subscriber has different MSISDNs for different services, each MSISDN is returned in a separate line.
Command syntax: AT+CNUM
Response syntax ;
+CNUM: <alpha1>, <number1>, <type1>
<CR><LF> +CNUM: <alpha2>, <number2>, <type2> ....
Defined values
<alphax>: optional alphanumeric string associated with <numberx>
<numberx>: string type phone number of format specified by <typex>
<typex>: type of adress octet in integer format

| | | |
|---|---|---|
| Application to GSM | AT+CNUM | *Get MSISDN(s)* |
| GSM to application | +CNUM: "Phone" , "0612345678", 129<br>+CNUM: "Fax", "0687654321",129 | *MSISDNs* |
| Application to GSM | AT+CNUM ? | *Get current values* |
| GSM to application | +CNUM: "Phone","0612345678", 129<br>+CNUM: "Fax", "0687654321",129 | *MSISDNs* |
| Application to GSM | AT+CNUM= ? | *Get possible values* |
| GSM to application | OK | |

### 4.5.8 Avoid phonebook init +WAIP

This specific command allows to inhibit the initialization of SIM phonebooks (loading of the ADNs and FDNs only) during the next boots.
Command syntax: AT+WAIP=<mode>

| <mode> | Action |
|---|---|
| 0 | Normal initialization (with phonebooks) |
| 1 | No phonebook initialization for ADN and FDN |

| | | |
|---|---|---|
| Application to GSM | AT+WAIP? | *current values ?* |
| GSM to application | +WAIP: 0<br>OK | *Default value (init phonebooks)* |
| Application to GSM | AT+WAIP= ? | *possible values ?* |
| GSM to application | +WAIP: (0,1)<br>OK | *disable / enable* |
| Application to GSM | AT+WAIP=1 | *Inhibit initialization of phonebooks (next boot)* |
| GSM to application | OK | *no answer* |
| Application to GSM | AT&W | *Save modifications in E2PROM* |

Be careful: The given value should be stored in E2PROM, so the command AT&W must be used to save the new <mode> value.

## 4.6 Short Message Service commands

### 4.6.1 Parameters definition

| | |
|---|---|
| <da> | Destination Address, coded like GSM 03.40 TP-DA |
| <dcs> | Data Coding Scheme, coded like in document [5]. |
| <dt> | Discharge Time in string format: "yy/MM/dd,hh:mm:ss±zz" (Year [00-99], Month [01-12], Day [01-31], Hour, Minute, Second and Time Zone [quarters of an hour] ) |
| <fo> | First Octet, coded like SMS-SUBMIT first octet in document [4], default value is 17 for SMS-SUBMIT |
| <index> | Place of storage in memory. |
| <length> | Text mode (+CMGF=1): number of characters<br>PDU mode (+CMGF=0): length of the TP data unit in octets |
| <mid> | CBM Message Identifier. |
| <mr> | Message Reference. |
| <oa> | Originator Address. |
| <pid> | Protocol Identifier. |
| <pdu> | For SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format, coded as specified in doc [4]<br>For CBS: GSM 03.41 TPDU in hexadecimal format |
| <ra> | Recipient Address. |
| <sca> | Service Center Address |
| <scts> | Service Center Time Stamp in string format: "yy/MM/dd,hh:mm:ss±zz" (Year/Month/Day,Hour:Min:Seconds±TimeZone) |
| <sn> | CBM Serial Number |
| <st> | Status of a SMS-STATUS-REPORT |
| <stat> | status of message in memory. |
| <tooa> | Type-of-Address of <oa>. |
| <tora> | Type-of-Address of <ra>. |
| <tosca> | Type-of-Address of <sca>. |
| <vp> | Validity Period of the short message, default value is 167 |

### 4.6.2 Select message service +CSMS

The supported services are GSM originated (SMS-MO) and terminated short message (SMS-MT), Cell Broadcast Message (SMS-CB) services.
The syntax is: AT+CSMS=<service>
<service>:
0: SMS AT commands are compatible with GSM 07.05 Phase 2 version 4.7.0.
1: SMS AT commands are compatible with GSM 07.05 Phase 2 + version .

| | | |
|---|---|---|
| Application to GSM | AT+CSMS=0 | *SMS AT command* Phase 2 version 4.7.0 |
| GSM to application | +CSMS: 1, 1, 1<br>OK | *SMS-MO,SMS-MT and SMS-CB supported* |
| Application to GSM | AT+CSMS=1 | *SMS AT command* Phase 2 + |
| GSM to application | +CMS ERROR: 301 | *SMS service Phase 2+ not supported* |
| GSM to application | +CSMS: 0, 1, 1, 1<br>OK | *GSM 03.40 et 03.41 (SMS AT command* Phase 2 version 4.7.0*),*<br>*SMS-MO,SMS-MT and SMS-CB supported* |
| Application to GSM | AT+CSMS=? | *Possible service* |
| GSM to application | +CSMS: (0)<br>OK | *Only GSM 03.40 et 03.41 is possible (SMS AT command* Phase 2 version 4.7.0*)* |

### 4.6.3 Preferred Message Storage +CPMS

The incoming messages are automatically stored in the SIM.

| | | |
|---|---|---|
| Application to GSM | AT+CPMS? | *Read it* |
| GSM to application | +CPMS: "SM", 3, 10<br>OK | *3 messages are stored in SIM. 10 is the total available SIM memory.* |
| Application to GSM | AT+CPMS=? | *Possible storage* |
| GSM to application | +CPMS: "SM"<br>OK | *Only SIM is possible* |

### 4.6.4 Preferred Message Format +CMGF

The formats implemented are the *text mode* and the *PDU mode*.
In PDU mode, a complete SMS Message including all header information is passed as a binary string (in hexadecimal format, so only this set of characters is allowed: {'0','1','2','3','4','5','6','7','8','9', 'A', 'B','C','D','E','F'} ). Each pair or characters is converted to a byte (ex: '41' is converted to the ASCII character 'A', whoes ASCII code is 0x41 or 65).
In Text mode, every commands and responses are in ASCII characters.
The chosen format is stored in E2PROM by the command +CSAS.

| | | |
|---|---|---|
| Application to GSM | AT+CMGF ? | *current message format* |
| GSM to application | +CMGF: 1<br>OK | *Text mode* |
| Application to GSM | AT+CMGF=? | *Possible message format* |
| GSM to application | +CMGF: (0-1)<br>OK | *Text or PDU modes are available* |

Example to send a SMS Message in PDU mode

| | | |
|---|---|---|
| Application to GSM | AT+CMGF=0 | *PDU message format* |
| GSM to application | OK | *PDU mode valid* |
| Application to GSM | AT+CMGS=14<CR><br>0001030691214365000004C9E9340B | *Send complete MSG in PDU mode, no SC address* |
| GSM to application | +CMGS: 4<br>OK | *MSG correctly sent, <mr> is returned* |

The message <pdu> is composed of the SC address (« 00 means no SC address given, use default SC address read with +CSCA command) and the TPDU message.
The length of octets of the TPDU buffer is 14, coded as GSM 03.40
In this case the TPDU is: 0x01 0x03 0x06 0x91 0x21 0x43 0x65 0x00 0x00 0x04 0xC9 0xE9 0x34 0x0B, which means regarding GSM 03.40:

| | |
|---|---|
| <fo>: | 0x01 (SMS-SUBMIT, no validity period) |
| <mr> (TP-MR): | 0x03 (Message Reference) |
| <da> (TP-DA): | 0x06 0x91 0x21 0x43 (destination address +123456) |
| <pid> (TP-PID): | 0x00 (Protocol Identifier) |
| <dcs> (TP-DCS): | 0x00 (Data Coding Scheme: 7 bits alphabet) |
| <length> (TP-UDL): | 0x04 (User Data Length, 4 characters of text) |
| TP-UD: | 0xC9 0xE9 0x34 0x0B (User Data: ISSY) |

TPDU in hexadecimal format must be converted into two ASCII characters, e.g. octet with hexadecimal value 0x2A is presented to the mobile as two characters '2' (ASCII 50) and 'A' (ASCII 65).

### 4.6.5 Save Settings +CSAS

All settings specified in command +CSCA and +CSMP are stored in E2PROM if the SIM card is a phase 1 card or in the SIM card if it is phase 2.

| | | |
|---|---|---|
| Application to GSM | AT+CSAS | *Store +CSCA and +CSMP parameters* |
| GSM to application | OK | *Parameters are saved* |

### 4.6.6 Restore settings +CRES

All settings specified in command +CSCA and +CSMP are restored from E2PROM if the SIM card is phase 1 or from the SIM card if it is a phase 2 SIM card.

| | | |
|---|---|---|
| Application to GSM | AT+CRES | *Restore +CSCA and +CSMP parameters* |
| GSM to application | OK | *Parameters are saved* |

### 4.6.7 Show text mode parameters +CSDH

This commands gives more informations in text mode result codes. These informations are in brackets in commands +CMTI, +CMT, +CDS, +CMGR, +CMGL.

| | | |
|---|---|---|
| Application to GSM | AT+CSDH? | *current value* |
| GSM to application | +CSDH: 0<br>OK | *do not show header values* |

### 4.6.8 New message indication +CNMI

This command selects the procedure how receiving the message from the network.The application must send the following command:
Command syntax: AT+CNMI=<mode>,<mt>,<bm>,<ds>,<bfr>

<mode>: controls the processing of unsolicited result codes

| | |
|---|---|
| 0 | Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications. |
| 1 | Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved. Otherwise forward them directly to the TE. |
| 2 | Buffer unsolicited result codes in the TA when TA-TE link is reserved and flush them to the TE after reservation. Otherwise forward them directly to the TE |
| 3 | Forward unsolicited result codes directly to the TE. TA-TE link specific inband used to embed result codes and data when TA is in on-line data mode. |

<mt>: sets the result code indication routing for SMS-DELIVERs

| | |
|---|---|
| 0 | No SMS-DELIVER indications are routed. |
| 1 | SMS-DELIVERs are routed using unsolicited code:<br>+CMTI: « SM », <index> |
| 2 | SMS-DELIVERs (except class 2 messages) are routed using unsollicited code:<br>+CMT: [<alpha>,] <length> <CR> <LF> <pdu> (PDU mode)<br>or<br>+CMT: <oa>,[<alpha>,] <scts> [,<tooa>, <fo>, <pid>, <dcs>, <sca>, <tosca>, <length>] <CR><LF><data> (text mode) |
| 3 | Class 3 SMS-DELIVERS are routed directly using code in <mt>=2 ;<br>Message of other classes result in indication <mt>=1 |

<bm>: set the rules for storing received CBMs (Cell Broadcast Message) types depend on its coding scheme, the setting of Select CBM Types (+CSCB command) and <bm>

| | |
|---|---|
| 0 | No CBM indications are routed to the TE. |
| 2 | New CBMs are routed directly to the TE using unsolicited result code.<br>+CBM: <length><CR><LF><pdu> (PDU mode)<br>or<br>+CBM:<sn>,<mid>, <dcs>,<page>,<pages> (Text mode)<br><CR><LF> <data> |

<ds> for SMS-STATUS-REPORTs

| | |
|---|---|
| 0 | No SMS-STATUS-REPORTs are routed. |
| 1 | SMS-STATUS-REPORTs are routed using unsolicited code:<br>+CDS: <length> <CR> <LF> <pdu> (PDU mode)<br>or<br>+CDS: <fo>,<mr>, [<ra>] , [<tora>], <scts>,<dt>,<st> (Text mode) |

<bfr>

| | |
|---|---|
| 0 | TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes) |
| 1 | TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered. |

Examples:

| | | |
|---|---|---|
| Application to GSM | AT+CNMI=0,1,0,0,0 | *<mt>=1* |
| GSM to application | OK | |
| GSM to application | +CMTI: "SM", 1 | *Message received* |
| Application to GSM | AT+CNMI=0,2,0,0,0 | *<mt>=2* |
| GSM to application | OK | |
| GSM to application | +CMT:"123456","98/10/01,12:30:00+00", 129, 4, 32, 240, "15379", 129,5<CR><LF><br>Received Message | *Message received* |
| Application to GSM | AT+CNMI=0,0,0,1,0 | *<ds>=1* |
| GSM to application | OK | |
| Application to GSM | AT+CMGS="+33146290800"<CR><br>Message to send <ctrl-Z> | *Send a message in text mode* |
| GSM to application | +CMGS: 7<br>OK | *Successful transmission* |
| GSM to application | +CDS: 2, 116, "+33146290800",145,<br>"98/10/01,12:30:07+04",<br>"98/10/01 12:30:08+04", 0 | *Message was delivered correctly* |

### 4.6.9 Read message +CMGR

This command allows the application to read stored messages.

Command syntax: AT+CMGR=<index>

Response syntax for text mode:

+CMGR:<stat>,<oa>,[<alpha>,] <scts> [,<tooa>,<fo>, <pid>,<dcs>,<sca>,<tosca>,<length>] <CR><LF> <data>
(for SMS-DELIVER only)

+CMGR:<stat>,<da>,[<alpha>,] [,<toda>,<fo>,<pid>,<dcs>, [<vp>], <sca>, <tosca>,<length>]<CR><LF> <data>
(for SMS-SUBMIT only)

Response syntax for PDU mode:

+CMGR: <stat>, [<alpha>] ,<length> <CR><LF> <pdu>

A message read with status "REC UNREAD" will be updated in memory with the status "REC READ" because it has been read.

Example:

| | | |
|---|---|---|
| GSM to application | +CMTI: "SM",1 | *New message received* |
| Application to GSM | AT+CMGR=1 | *read the message* |
| GSM to application | +CMGR: "REC UNREAD",<br>"0146290800","98/10/01,18:22:11+00" ,<br><CR><LF><br>ABCdefGHI<br>OK | |
| Application to GSM | AT+CMGR=1 | *read again the message* |
| GSM to application | +CMGR: "REC READ",<br>"0146290800","98/10/01,18:22:11+00",<br><CR><LF><br>ABCdefGHI<br>OK | *message is read now,* |
| Application to GSM | AT+CMGR=2 | *Read a bad index* |
| GSM to application | +CMS ERROR: 321 | *error: invalid index* |
| Application to GSM | AT+CMGF=0 ;+CMGR=1 | *in PDU mode* |
| GSM to application | +CMGR: 2,,<length> <CR><LF> <pdu><br>OK | *Message is stored but unsent, no <alpha> field* |

### 4.6.10 List message +CMGL

This command allows the application to read stored messages, by indicating the type of the message to read.
Command syntax: AT+CMGL=<stat>
Response syntax for text mode:
+CMGL: <index>,<stat>,<da/oa>[,<alpha>], [<scts>, <tooa/toda>, <length>] <CR><LF><data> (for SMS-DELIVER and SMS-SUBMIT, may be followed by other <CR><LF>+CMGL:<index>...)

Response syntax for PDU mode:
+CMGL: <index>,<stat>, [<alpha>], <length> <CR><LF> <pdu>
(for SMS-DELIVER and SMS-SUBMIT,
may be followed by other <CR><LF>+CMGL:<index>...)

<stat> possible values (status of message in memory):

| PDU mode | Text mode |
|---|---|
| 0 | "REC UNREAD" ( received unread message ) |
| 1 | "REC READ" ( received read message ) |
| 2 | "STO UNSENT" ( stored unsent message ) |
| 3 | "STO SENT" ( stored sent message ) |
| 4 | "ALL" ( all messages ) |

| | | |
|---|---|---|
| Application to GSM | AT+CMGL="REC UNREAD" | *List unread messages in text mode* |
| GSM to application | +CMGL: 1, "REC UNREAD", "0146290800", <CR><LF><br>Unread Message!<br>+CMGL: 3, "REC UNREAD", "46290800", <CR><LF><br>Another Unread Message!<br>OK | *2 messages are unread, these messages will then have their status changed to "REC READ".*<br>*(+CSDH: 0)* |
| Application to GSM | AT+CMGL="REC READ" | *List read messages in text mode* |
| GSM to application | +CMGL: 2, "REC READ", "0146290800", <CR><LF><br>Keep cool<br>OK | |
| Application to GSM | AT+CMGL="STO SENT" | *read stored and sent messages* |
| GSM to application | +CMS ERROR: 322 | *No message found* |

### 4.6.11 Send message +CMGS

Command syntax in text mode:
AT+CMGS= <da> [ ,<toda> ] <CR>
*text is entered* <ctrl-Z / ESC >
Command syntax in PDU mode:
AT+CMGS= <length> <CR>
*PDU is entered* <ctrl-Z / ESC >

The <address> field is the address of the terminal network to whom the message is sent. To send the message, simply type <ctrl-Z> character (ASCII 26). The text can contain all existing character except <ctrl-Z> and <ESC> (ASCII 27).
This command is abortable using the <ESC> character when entering text.
In PDU mode, only hexadecimal characters are used ('0'...'9','A'...'F').
Example of use:

| | | |
|---|---|---|
| Application to GSM | AT+CMGS="+33146290800"<CR><br>Please Call me soon, Fred.<ctrl-Z> | *Send a message in text mode* |
| GSM to application | +CMGS: <mr><br>OK | *Successful transmission* |
| Application to GSM | AT+CMGS=<length><CR><br><pdu><ctrl-Z> | *Send a message in PDU mode* |
| GSM to application | +CMGS: <mr><br>OK | *Successful transmission* |

The message reference <mr> which is returned back to the application is allocated by the GSM module. This number begins with 0 and is incremented by one for each outgoing message (successful and failure case) ; it is cyclic on one byte (0 follows 255).
Note: this number is not a storage number - outgoing messages are not stored.

### 4.6.12 Write Message to Memory +CMGW

This command stores a message to memory storage (either SMS-SUBMIT or SMS-DELIVERS). The memory location <index> is returned (no choice possible as with phonebooks +CPBW).
The entering of text or PDU is done similarly as specified in command Send Message +CMGS.

Command syntax in text mode: (<index> is returned in both cases)
AT+CMGW= <oa/da> [,<tooa/toda> [,<stat> ] ] <CR>

*enter text* <ctrl-Z / ESC>

Command syntax in PDU mode:
AT+CMGW= <length> [,<stat>] <CR>

*give PDU* <ctrl-Z / ESC>

Response syntax: +CMGW: <index>
or +CMS ERROR: <err> if writing fails

Parameter Definition:
<oa/da>: Originating or Destination Adress Value in string format. If <oa/da> is omitted it must be entered with +CMSS command.
<tooa/toda>: Type of Originating / Destination Adress.

<stat>: Integer type in PDU mode *(default 2 for +CMGW)*, or string type in text mode *(default "STO UNSENT" for +CMGW)*. It indicates the status of message in memory. If <stat> is omitted , the stored message is considered like a message to be send.

Defined <stat> values:

| PDU mode | Text mode |
|---|---|
| 0 | "REC UNREAD" |
| 1 | "REC READ" |
| 2 | "STO UNSENT" |
| 3 | "STO SENT" |

<length>: The length of the actual data unit in octets

Example:

| | | |
|---|---|---|
| Application to GSM | AT+CMGW="+33146290800"<CR><br>Hello, how are you ?<ctrl-Z> | *Write a message in text mode* |
| GSM to application | +CMGW: 4<br>OK | *Message stored in index 4* |
| Application to GSM | AT+CMGW=<length><CR><br><pdu><ctrl-Z> | *Write a message in PDU mode* |
| GSM to application | +CMGW: <index><br>OK | *Message stored in <index>* |

### 4.6.13 Send Message From Storage +CMSS

This command sends message with location value <index> from storage to the network.
Command syntax: AT+CMSS=<index>[,<da> [,<toda>] ]
Response syntax: +CMSS: <mr>
or +CMS ERROR: <err> if sending fails
If new recipient address <da> is given, it will be used instead of the one stored with the message.
Example of use in Text Mode:

| | | |
|---|---|---|
| Application to GSM | AT+CMGW=<CR><br>Today is my birthday<ctrl-Z> | *Write a message in text mode* |
| GSM to application | +CMGW: 5<br>OK | *Message stored in index 5* |
| Application to GSM | AT+CMSS=5,0660123456 | *Send the message 5* |
| GSM to application | +CMSS: <mr><br>OK | *Successful Transmission* |
| Application to GSM | AT+CMSS=5, 0680654321 | *Send the message 5 to a different GSM* |
| GSM to application | +CMSS: <mr><br>OK | *Successful Transmission* |

### 4.6.14 Set Text Mode Parameters +CSMP

This command shall be used to select value for the <vp>, <pid>, the <dcs>. The application must send the following command:
Command syntax: AT+CSMP=<fo>, <vp>, <pid>,<dcs>

<fo> byte is composed of 6 differents fields:

| b7 | b6 | B5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|
| *RP* | *UDHI* | *SRR* | *VPF* | *RD* | *MTI* | | |

*RP:* Reply Path, not used in text mode.
*UDHI:* User Data Header Information, b6=1 if the beginning of the User Data field contains a Header in addition to the short message. This option is not supported in +CSMP command, but can be used in PDU mode (+CMGS).
*SRR:* Status Report Request, b5=1 if a status report is requested. This mode is supported.
VPF: Validity Period Format
b4=0 & b3=0 -> <vp> field is not present
b4=1 & b3=0 -> <vp> field is present in relative format
Others formats (absolute & enhanced) are not supported.

RD: Reject Duplicates, b2=1 to instruct the SC to reject an SMS-SUBMIT for an SM still held in the SC which has the same <mr> and the same <da> as the previously submitted SM from the same <oa>.
MTI: Message Type Indicator
b1=0 & b0=0 -> SMS-DELIVER (in the direction SC to MS)
b1=0 & b0=1 -> SMS-SUBMIT (in the direction MS to SC)

In text mode <vp> is only coded in "*relative*" format. The default value is 167 (24 hours). This means that one octet can describe different values:

| VP value | Validity period value |
|---|---|
| 0 to 143 | (VP + 1) x 5 minutes (up to 12 hours) |
| 144 to 167 | 12 hours + ( (VP - 143) x 30 minutes ) |
| 168 to 196 | (VP - 166) x 1 day |
| 197 to 255 | (VP - 192) x 1 week |

<pid> is used to indicate the higher layer protocol being used or indicates interworking with a certain type of telematic device. For example, 0x22 is for group 3 telefax, 0x24 is for voice telephone, 0x25 is for ERMES.
<dcs> is used to determine the way the information is encoded. UCS2 alphabet and compressed text are not supported. Only GSM default alphabet and 8 bit data are supported.

| | | |
|---|---|---|
| Application to GSM | AT+CSMP? | *current values* |
| GSM to application | +CSMP: 0,0,0,0<br>OK | *no validity period*<br>*<dcs>= PCCP437 alphabet (8 bits -> 7 bits )* |
| Application to GSM | AT+CSMP=16,23,64,244 | *<vp> = 23 (2 hours, relative format)*<br>*<dcs> = GSM 8 bits alphabet* |
| GSM to application | OK | *command correct* |

### 4.6.15 Delete message+CMGD

This command shall be used after a read-command in order to delete the any stored message.
For example:

| | | |
|---|---|---|
| GSM to application | +CMTI: "SM",3 | *New message received* |
| Application to GSM | AT+CMGR=3 | *Read it* |
| GSM to application | +CMGR: "REC UNREAD", "0146290800",,"98/10/01,18:19:20+00" <CR><LF><br>Received Message!<br>OK | *Unread message received from 0146290800 on the 01/10/1998 at 18H 19m 20s* |
| Application to GSM | AT+CMGD=3 | *Delete it* |
| GSM to application | OK | *Message deleted* |

### 4.6.16 Service center address +CSCA

This command shall be used to indicate to which service center the message has to be sent.
The GSM module has no default value for this address. If the application tries to send a message without having indicated the service center address, an error will be generated.
So, the application has to indicate this address at initialization. This address is then valid all the time. The application may change it if needed.

| | | |
|---|---|---|
| Application to GSM | AT+CMGS="+33146290800"<CR><br>Hello, how are you ?<ctrl-Z> | *Send a message* |
| GSM to Application | +CMS ERROR: 330 | *Service center unknown* |
| Application to GSM | AT+CSCA="0696741234" | *Service center initialization* |
| GSM to application | OK | |
| Application to GSM | AT+CMGS="+33146290800"<CR><br>Happy Birthday !<ctrl-Z> | *Send again the same message* |
| GSM to application: | +CMGS: 1<br>OK | *Successful transmission* |

### 4.6.17 Select Cell Broadcast Message Types +CSCB

Command syntax: *AT+CSCB= <mode>, [ <mids>, [ <dcss> ] ]*
Set command selects which types of CBMs are to be received by the ME, This command is allowed in both PDU and text modes with <bm>=2 in AT+CNMI command (ex: AT+CNMI=2,2,2).
Test command (AT+CSCB ?) returns supported <mode> values as a compound value.
The activation of CBM reception (<mode>=0) can select only specific Message Identifiers (list in <mids>) for specific Languages (list in <dcss>), but the deactivation stops any reception of CBMs (only AT+CSCB=1 is allowed)
Message Identifiers (<mids> parameter) indicates which type of message identifiers the ME should listen to.
Supported languages (<dcss> parameter) are: 0 for German, 1 for English, 2 for Italian, 3 for French, 4 for Spanish, 5 for Dutch, 6 for Swedish, 7 for Danish, 8 for Portugese, 9 for Finnish, 10 for Norwegian, 11 for Greek, 12 for Turkish, 13 for Hungarian, 14 for Polish and 32 for Czech.

| | | |
|---|---|---|
| Application to GSM | AT+CSCB=0,"15-17,50,86", "" | *Accept SMS-CB types 15,16,17,50 and 86 in any language* |
| GSM to Application | OK | *CBMs can be received* |
| Application to GSM | +CBM: 10<CR><LF><br>00112233445566778899 | CBM length of a received Cell Broadcast message (SMS-CB),<br>CBM bytes in PDU mode |
| GSM to application | AT+CSCB=1 | Deactivate the reception of CBMs |
| Application to GSM | OK | *CBM reception is completely stopped* |

### 4.6.18 Cell Broadcast Message Identifiers +WCBM

Command syntax: AT+CSCB= <mode> [, <mids>, <dcss> ]
This specific command is used to read the SIM file EF-CBMI.
This file is not used with +CSCB command, the application should read this file (AT+WCBM ?) and combine the Message Identifiers with those required for the application.

| | | |
|---|---|---|
| Application to GSM | AT+WCBM="10,100,1000,10000" | *Write 4 message identifiers in EF-CBMI* |
| GSM to Application | OK | *CBMIs are stored if EF-CBMI* |
| Application to GSM | AT+WCBM ? | Read the CBMIs in EF-CBMI |
| GSM to application | +WCBM="10,100,1000,10000" | 4 CBMIs are stored if EF-CBMI |

## 4.7 Supplementary Services commands

### 4.7.1 Call forwarding +CCFC

This commands allows control of the call forwarding supplementary service.
Command syntax:
AT+CCFC= <reason>, <mode> [, <number> [,<type> [,<class> [,<subaddr> [, <satype> [,<time> ] ] ] ] ] ]

Response syntax:
+CCFC: <status>, <class1> [, <number>, <type> [,<subaddr>, <satype> [,<time> ] ] ]
[ <CR><LF>+CCFC: <status>, <class2> [, <number>, <type> [,<subaddr>, <satype> [,<time> ] ] ]
[ ... ] ]

* <reason>:

| | |
|---|---|
| 0 | Unconditional |
| 1 | Mobile busy |
| 2 | No reply (<time> is used) |
| 3 | Not reachable |
| 4 | All call forwarding |
| 5 | All conditionnal call forwarding |

* <mode>:

| | |
|---|---|
| 2 | Interrogate |
| 3 | Registration |
| 4 | Erasure |

* <class>:

| | |
|---|---|
| 1 | Voice |
| 2 | Data |
| 4 | Fax |
| 8 | Short Messages |
| 7 | All classes |

The combination of different classes in not supported, it will only result in the activation / deactivation / status request of all classes (7).

* <subaddr>, <satype>: not managed
* <time>: For Call Barring on No Reply, time to wait (1 to 30) in seconds before call is forwarded, default value is 20 seconds.

| | | |
|---|---|---|
| Application to GSM | AT+CCFC=0,3, "0146290800" | *register call forwarding unconditional* |
| GSM to application | OK | *Command valid* |
| Application to GSM | AT+CCFC=0,2 | *Interrogate call forwarding unconditional* |
| GSM to application | +CCFC:1,1, "0146290800" ,129<br><CR><LF>+CCFC:1,2, "0146290802",129<br><CR><LF>+CCFC:1,4, "0146290804" ,129<br>OK | *call forwarding active for voice*<br>*call forwarding active for data*<br>*call forwarding active for fax* |
| Application to GSM | AT+CCFC=0,4 | *erase call forwarding unconditional* |
| GSM to application | OK | *Command valid* |

The +CCFC responses are not sorted depending of the <class> parameter, it only depends of the order of the network response.

### 4.7.2 Call barring +CLCK

This commands allows control of the call barring supplementary service. Locking, unlocking or querying the status of a call barring is possible for all or a specific class.

Command Syntax:
AT+CLCK= <fac>, <mode> [, <password> [, <class> ] ]

Response Syntax: (for <mode>=2 and command successful)
+CLCK: <status> [, <class1>
[ <CR><LF>+CLCK: <status>, <class2>
[ ... ] ]

* <fac>:
"AO", "OI", "OX" for outgoing calls barring
"AI", "IR" for incoming calls barring
"AG", "AC", "AB" for all calls barring (<mode>=0 only)

*<mode>

| | |
|---|---|
| 0 | unlocks the facility |
| 1 | locks the facility |
| 2 | query status |

* <class>: see description for +CLCK command (Call Barring)
The combination of different classes in not supported, it will only result in the activation / deactivation / status request of all classes (7).
Password code must be on 4 digits maximum.

| | | |
|---|---|---|
| Application to GSM | AT+CLCK="AO",1,1234 | |
| GSM to application | OK | *Command valid* |
| Application to GSM | AT+CLCK="AO",0,5555 | |
| GSM to application | +CME ERROR: 16 | *Wrong password* |
| Application to GSM | AT+CLCK="AO",0,1234 | |
| GSM to application | OK | *Command valid* |

### 4.7.3 Modify SS password +CPWD

This command shall be used by the application to change the supplementary service password. The command to manage this functionality is:
Command Syntax:
AT+CPWD=<fac>,<OldPassword>, <NewPassword>
for <fac> see +CLCK command with only “P2” facility added (SIM PIN2).

| | | |
|---|---|---|
| Application to GSM | AT+CPWD="AO",1234,5555 | *change Call Barring password* |
| GSM to application | OK | *password changed* |
| Application to GSM | AT+CPWD="AO",1234,5555 | *Change password* |
| GSM to application | +CME ERROR: 16 | *wrong password* |
| Application to GSM | AT+CPWD="AO",5555,1234 | *change password* |
| GSM to application | OK | *password changed* |

### 4.7.4 Call waiting +CCWA

This command allows control of the call waiting supplementary service. The module supports only one communication. If a call waiting call happens, the module will disconnect it but with a +CCWA: <TelNb>,<TonNpi> indication.
Command Syntax: AT+CCWA=<n>, [ <mode> [, <class> ] ]
Unsolicited message: +CCWA: <number>, <type> (for incoming call)

* <n>: Result code presentation status in the TA

| | |
|---|---|
| 0 | Disable |
| 1 | Enable |

* <mode>:

| | |
|---|---|
| 0 | Disable |
| 1 | Enable |
| 2 | Query status |

* <class>:

| | |
|---|---|
| 1 | Voice |
| 2 | Data |
| 4 | Fax |
| 8 | Short Messages |
| 7 | All classes |

The combination of different classes in not supported, it will only result in the activation / deactivation / status request of all classes (7).

| | | |
|---|---|---|
| Application to GSM | AT+CCWA=1,1,1 | *Enable call waiting for speech* |
| GSM to application | OK | *Command valid* |
| Application to GSM | AT+CCWA=1,2 | *Interrogate call waiting* |
| GSM to application | +CCWA:1,1<br>OK | *Call waiting active for speech calls* |
| Application to GSM | +CCWA: "0146290800",145 | *Number of the incoming call while already in communication*<br>*incoming call is disconnected without any notification* |
| Application to GSM | AT+CCWA=1,0,7 | *erase call waiting for all classes* |
| GSM to application | OK | *command valid* |

### 4.7.5 Calling line identification restriction +CLIR

This command allows control of the calling line identification restriction supplementary service.

Command syntax: AT+CLIR=<n>

Response syntax: +CLIR:<n>,<m> (for AT+CLIR?)

* <n>: parameter sets the adjustment for outgoing calls

| | |
|---|---|
| 0 | Presentation indicator is used according to the subscription of the CLIR service |
| 1 | CLIR invocation |
| 2 | CLIR suppression |

* <m>: parameter shows the subscriber CLIR status in the network

| | |
|---|---|
| 0 | CLIR not provisioned |
| 1 | CLIR provisioned in permanent mode |
| 2 | Unknown (no network...) |
| 3 | CLIR temporary mode presentation restricted |
| 4 | CLIR temporary mode presentation allowed |

| | | |
|---|---|---|
| Application to GSM | AT+CLIR=2 | |
| GSM to application | OK | *command valid* |
| Application to GSM | AT+CLIR? | *Ask for current functionality* |
| GSM to application | +CLIR: <n>,<y><br>OK | *<n> and <m> defined as above* |

### 4.7.6 Calling line identification presentation +CLIP

This command allows control of the calling line identification presentation supplementary service:

Command syntax: AT+CLIP=<n>
Response syntax: +CLIP: <n>,<m> (for AT+CLIP?)
Unsolicited message: +CLIP: <number>, <type> (for incoming call)

* <n>: parameter sets/shows the result code presentation in the TA

| | |
|---|---|
| 0 | disable |
| 1 | enable |

- <m>: parameter shows the subscriber CLIP service status in the network

| | |
|---|---|
| 0 | CLIP not provisioned |
| 1 | CLIP provisioned |
| 2 | Unknown (no network...) |

| | | |
|---|---|---|
| Application to GSM | AT+CLIP=1 | *Enable CLIP* |
| GSM to application | OK | *CLIP is enabled* |
| Application to GSM | AT+CLIP? | *Ask for current functionality* |
| GSM to application | +CLIP: <n>,<m><br>OK | *<n> and <m> defined as above* |
| GSM to application | RING<br>+CLIP: "0146290800",129 | *Incoming call*<br>*Incoming call number presentation* |
| Application to GSM | AT+CLIP=0 | *Disable CLIP presentation* |
| GSM to application | OK | *Command valid* |

### 4.7.7 Connected line identification presentation +COLP

This command allows control of the connected line identification presentation supplementary service, useful in case of call forwarding of the connected line.

Command syntax: AT+COLP=<n>
Response syntax: +COLP: <n>,<m> (for AT+COLP?)
Intermediate message: +COLP: <number>,<type> (after ATD)
<n>: parameter sets/shows the result code presentation status in the TA

| | |
|---|---|
| 0 | Disable |
| 1 | Enable |

<m>: parameter shows the subscriber COLP service status in the network

| | |
|---|---|
| 0 | COLP not provisioned |
| 1 | COLP provisioned |
| 2 | Unknown (no network...) |

| | | |
|---|---|---|
| Application to GSM | AT+COLP=1 | *Activate COLP* |
| GSM to application | OK | *Command valid* |
| Application to GSM | AT+COLP? | *Ask for current functionality* |
| GSM to application | +COLP: 1,1<br>OK | *COLP is enabled and provisioned* |
| Application to GSM | ATD146290800; | *Outgoing call* |
| GSM to application | +COLP: "0146290928",129<br>OK | *Connected outgoing line presentation* |
| Application to GSM | AT+COLP=0 | *desactivate COLP* |
| GSM to application | OK | *command valid* |

### 4.7.8 Advice of charge +CAOC

Command syntax: AT+CAOC= <mode>

This refers to Advice of Charge supplementary service (GSM 02.24 [] and GSM 02.86 []) that enables subscriber to get information about the cost of calls. With <mode>=0, the execute command returns the current call meter value (CCM) from the ME.

If AOC is supported, the command also includes the possibility to enable an unsolicited event reporting of the CCM information.

The unsolicited result code +CCCM: <ccm> is sent when the CCM value changes. Deactivation of the unsolicited event reporting is made with the same command.

If AOC is supported, the Read command indicates whether the unsolicited reporting is activated or not.

Defined values

<mode>:

0 query CCM value
1 deactivate the unsolicited reporting of CCM value
2 activate the unsolicited reporting of CCM value

<ccm>:

string type; three bytes of the current call meter value in hexadecimal format (e.g. "00001E" indicates decimal value 30); value is in home units and bytes are similarly coded as ACMmax value in the SIM

| | | |
|---|---|---|
| Application to GSM | AT+CAOC=0 | *Query CCM value* |
| GSM to application | +CAOC: "000A08"<br>OK | *Display Current Call Meter value (CCM = 2568)* |
| Application to GSM | AT+CAOC=1 | *Deactivate unsolicited report of CCM value* |
| GSM to application | OK | *CCM report deactivated* |
| Application to GSM | AT+CAOC=2 | *Activate unsolicited report of CCM value* |
| GSM to application | OK | *CCM report activated* |
| Application to GSM | AT+CAOC ? | *Request mode* |
| GSM to application | +CAOC: <mode><br>OK | *Display unsolicited report mode (1 or 2)* |
| Application to GSM | AT+CAOC= ? | *Request supported modes* |
| GSM to application | +CAOC: (0-2)<br>OK | *0,1,2 modes supported* |

### 4.7.9 Accumulated call meter +CACM

Set command resets the Advice of Charge related accumulated call meter value in SIM file $EF_{ACM}$. ACM contains the total number of home units for both the current and preceding calls. SIM PIN2 is required to reset the value. If setting fails in an ME error, +CME ERROR: <err> is returned.

Read command returns the current value of ACM.

Then ACM value (entered or displayed) is in hexadecimal format with 6 digits.

| | | |
|---|---|---|
| Application to GSM | AT+CACM ? | *Request ACM value* |
| GSM to application | +CACM: "000400"<br>OK | *Display ACM value*<br>*(ACM = 1024)* |
| Application to GSM | AT+CACM= 1234 | *Request ACM reset, real PIN2 is* "1234" |
| GSM to application | OK | *ACM value is reset* |
| Application to GSM | AT+CACM= 0000 | *Request ACM reset with wrong PIN2 value* |
| GSM to application | +CME ERROR: 17 | *SIM PIN2 required* |
| Application to GSM | AT+CACM ? | *Request ACM value* |
| GSM to application | +CACM: "000000"<br>OK | *Display ACM value*<br>*(ACM = 0)* |

### 4.7.10 Accumulated call meter maximum +CAMM

Set command sets the Advice of Charge related accumulated call meter maximum value in SIM file $EF_{ACMmax}$. ACMmax contains the maximum number of home units allowed to be consumed by the subscriber. When ACM (refer +CACM) reaches ACMmax, then calls are prohibited. SIM PIN2 is required to set the value. If setting fails in an ME error, +CME ERROR: <err> is returned.
Read command returns the current value of ACMmax.
Them ACMmax value (entered or displayed) is in hexadecimal format with 6 digits.

| | | |
|---|---|---|
| Application to GSM | AT+CAMM= "000400", 1234 | *Request ACMmax update, real PIN2 is* "1234" |
| GSM to application | OK | *ACMmax updated to 1024* |
| Application to GSM | AT+CAMM= "000400",0000 | *Request ACMmax update, real PIN2 is* "1234" |
| GSM to application | +CME ERROR: 17 | *SIM PIN2 required* |
| Application to GSM | AT+CAMM ? | *Request ACMmax value* |
| GSM to application | +CAMM: "000400"<br>OK | *ACMmax=1024* |

### 4.7.11 Price per unit and currency table +CPUC

Description
Set command sets the parameters of Advice of Charge related price per unit and currency table in SIM file $EF_{PUCT}$. PUCT information can be used to convert the home units (as used in +CAOC, +CACM and +CAMM) into currency units. SIM PIN2 is required to set the parameters. If setting fails in an ME error, +CME ERROR: <err> is returned.

| | | |
|---|---|---|
| Application to GSM | AT+CPUC= "FFR", "0.82", 1234 | *Request Currency and Price per unit update* |
| GSM to application | OK | |
| Application to GSM | AT+CPUC= "FFR", "0.82", 1111 | *Request Currency and PPU update (wrong PIN2)* |
| GSM to application | +CME ERROR: 17 | *SIM PIN2 required* |
| Application to GSM | AT+CPUC? | *Request Currency & Price* |
| GSM to application | +CPUC: "FFR", "0.82"<br>OK | *Currency*= "FFR"<br>Price per unit= "0.82" |

# 4.8 Data commands

## 4.8.1 Bearer type selection +CBST

Command syntax: AT+CBST= <speed>, <name>, <ce>
No data compression is provided and only asynchronous modem is supported (<name> = 0).

| <speed> | Description | Modem type |
|---|---|---|
| 0 | Autobauding | None |
| 1 (*) | 300 bps | V.21 |
| 2 (*) | 1200 bps | V.22 |
| 3 (*) | 1200/75 bps | V.23 |
| 4 | 2400 bps | V.22bis |
| 5 | 2400 bps | V.26ter |
| 6 | 4800 bps | V.32 |
| 7 | 9600 bps | V.32 |
| 8 | Specific | |
| 65 (*) | 300 bps | V.110 |
| 66 (*) | 1200 bps | V.110 |
| 68 | 2400 bps | V.110 |
| 70 | 4800 bps | V.110 |
| 71 | 9600 bps | V.110 |

(*) Only for non transparent mode

| <ce> | Connection element |
|---|---|
| 0 | Transparent only |
| 1 | Non transparent only |
| 2 | Transparent preferred |
| 3 | Non transparent preferred |

| | | |
|---|---|---|
| Application to GSM | AT+CBST=7,0,1 | *ask for a bearer* |
| GSM to application | OK | *bearer supported* |
| Application to GSM | AT+CBST=81,0,0 | *ask for a bearer* |
| GSM to application | +CME ERROR: 4 | *bearer not supported* |

This command applies to both outgoing and incoming data calls but in a different way. For outgoing call the two parameters (e.g. <speed> and <ce>) apply, whereas for incoming call only the <ce> parameter applies.
Note 1) as far as incoming calls are concerned, if <ce> is set to T only and the network proposes NT only or vice versa then the call is released.
Note 2) older values 100 and 101 for <ce> are retained for compatibility purpose but shallnot be used anymore, values 2 and 3 shall be used instead.

## 4.8.2 Service reporting control +CR

This command enables a more detailed service reporting, in case of data outgoing call. Before sending the CONNECT response to the application, the GSM module will precise the type of data connection that have been established.
These report types are:

| | |
|---|---|
| +CR: ASYNC | for asynchronous transparent |
| +CR: REL ASYNC | for asynchronous non-transparent |

| | | |
|---|---|---|
| Application to GSM | AT+CR=0 | *extended reports disabled* |
| GSM to application | OK | *command valid* |
| Application to GSM | AT+CR=1 | *extended reports enabled* |
| GSM to application | OK | *command valid* |

Default value is stored in E2PROM.

### 4.8.3 Cellular result codes +CRC

This command enables a more detailed ring indication, in case of incoming call (voice or data). Instead of the string "RING", an extended string is used to indicate which type of call is ringing (e.g. +CRING: VOICE).
These extended indications are:

| | |
|---|---|
| +CRING: ASYNC | for asynchronous transparent |
| +CRING: REL ASYNC | for asynchronous non-transparent |
| +CRING: VOICE | for normal speech. |
| +CRING: FAX | for fax calls |

| | | |
|---|---|---|
| Application to GSM | AT+CRC=0 | *extended reports disabled* |
| GSM to application | OK | *command valid* |
| Application to GSM | AT+CRC=1 | *extended reports enabled* |
| GSM to application | OK | *command valid* |

### 4.8.4 Radio link protocol parameters +CRLP

This command allows to change the radio link protocol parameters used for non transparent data transmission.
Command syntax: AT+CRLP=<up-window_size>,<down-window_size>,<acknowledgement-timer>, <retransmission_attempts>, <reset_allowed>

| | | |
|---|---|---|
| Application to GSM | AT+CRLP=10,10,90,10,0 | *set new parameters* |
| GSM to application | OK | *Command valid* |
| Application to GSM | AT+CRLP? | *Current values* |
| GSM to application | AT+CRLP: 10,10,90,10<br>OK | *Command valid* |

## 4.9 V24-V25 commands

### 4.9.1 Fixed DTE rate +IPR

This commands specifies the data rate at which the DCE will accept commands.

| | | |
|---|---|---|
| Application to GSM | AT+IPR? | |
| GSM to application | +IPR: 9600<br>OK | *current rate is 9600 bps* |
| Application to GSM | AT+IPR=? | |
| GSM to application | +IPR:(0,2400, 4800, 9600, 19200) ,<br>(300,600,38400,57600,115200)<br>OK | *possible values (1)* |
| Application to GSM | AT+IPR=38400 | |
| GSM to application | OK | *disable autobauding and set rate to 38400 bps* |
| Application to GSM | AT+IPR=0 | |
| GSM to application | OK | *enable autobauding* |

Note (1): first set of values indicates the range of autodetectable speeds. The second set of values indicates all the possible speeds which can be used by DCE.

An autobauding is provided which operates from 2400 to 19200 baud. However some constraints have to be dealt with:

- any AT command issued by DTE must start with a capital 'A' and 'T' (or '\'). If not, DCE may send back some garbagge characters and get de-synchronized. Shoud it happen, DTE shall just issue once or twice 'AT\r' (at 2400 or 4800 baud) or just 'AT' (at 9600 baud) to get the modem re-synchronized.
- the DTE shall wait for 1ms after receipt of the last character of the AT response (which is always '\n' or 0x0A) to send a new AT command at either the same rate or a new rate. Shoud this delay ignored, DCE can get de-synchronised. Once again, sending once or twice 'AT\r' or just 'AT' causes the DCE to recover.

Be careful: at start-up if autobauding is enabled and no AT command has been received yet, the module sends all unsolicited responses (like RING) at 9600 baud.

### 4.9.2 DTE-DCE character framing +ICF

This command is used to determine the local serial port start-stop (asynchronous) character framing that the DCE shall use.

Command syntax: AT+ICF= <format>, <parity>

* <format>:

| | | |
|---|---|---|
| 0 | Autodetect | not supported |
| 1 | 8 Data 2 Stop | supported |
| 2 | 8 Data 1 Parity 1 Stop | supported |
| 3 | 8 Data 1 Stop | supported |
| 4 | 7 Data 2 Stop | supported |
| 5 | 7 Data 1 Parity 1 Stop | supported |
| 6 | 7 Data 1 Stop | supported |

* <parity>:

| | | |
|---|---|---|
| 0 | Odd | supported |
| 1 | Even | supported |
| 2 | Mark | supported |
| 3 | Space | supported |
| 4 | None | supported |

Note 1) setting a character framing different from 8N1 will disable autobauding (in the case it was activated). However setting it back to 8N1 will not re-enable autobaud.
Note 2) setting the framing to 8N1 will let the autobauding enabled, if it was already enabled (implying framing was already 8N1).

| | | |
|---|---|---|
| Application to GSM | AT+ICF? | |
| GSM to application | +ICF: 3,4<br>OK | *current values* |
| Application to GSM | AT+ICF=? | |
| GSM to application | +ICF: (1-6),(0-4)<br>OK | *possible values.* |
| Application to GSM | AT+ICF=0,0 | |
| GSM to application | OK | *new values* |

### 4.9.3 DTE-DCE local flow control +IFC

This command is used to control the operation of local flow control between the DTE and DCE.
AT+IFC=<DCE_by_DTE>,<DTE_by_DCE>

* < DCE_by_DTE >:

| | | |
|---|---|---|
| 0 | none | supported |
| 1 | Xon/Xoff local circuit 103 | not supported |
| 2 | RTS | supported |
| 3 | Xon/Xoff global on circuit 103 | not supported |

Important note: when this parameter is set to 2 (DTE invokes flow control through RTS) the behavior of the DCE is the following:
If the DCE has never detected RTS in high (or ON) condition since startup then it ignores RTS, assuming this signal is not connected.
As soon as DCE detects RTS high, then this signal acts upon it. Therefore subsequent RTS transition to OFF will prevent DCE from sending any further data in online and in offline as well.
This behavior allows the user to use the default settings (hardware flow control) and let RTS disconnected. In the case RTS is connected and is high at least once then it acts upon DCE.

* < DTE_by_DCE >:

| | | |
|---|---|---|
| 0 | none | supported |
| 1 | Xon/Xoff circuit 104 | not supported |
| 2 | CTS | Supported |

When this parameter is set to 0 (none) then CTS is kept high all the time.

| | | |
|---|---|---|
| Application to GSM | AT+IFC? | |
| GSM to application | +IFC: 2,2<br>OK | *current values* |
| Application to GSM | AT+IFC=? | |
| GSM to application | +IFC: (2),(2)<br>OK | *possible values.* |
| Application to GSM | AT+IFC=0,0 | |
| GSM to application | OK | *new values* |

### 4.9.4 Set DCD signal &C

This commands controls the Data Carrier Detect (DCD) signal.

| | | |
|---|---|---|
| Application to GSM | AT&C0 | *DCD always on* |
| GSM to application | OK | *command valid* |
| Application to GSM | AT&C1 | *DCD matches state of the remote modem's data carrier* |
| GSM to application | OK | *command valid* |

### 4.9.5 Set DTR signal &D

This commands controls the Data Terminal Ready (DTR) signal.

| | | |
|---|---|---|
| Application to GSM | AT&D0 | *the DTR signal is ignored* |
| GSM to application | OK | *command valid* |
| Application to GSM | AT&D1 | *Modem switches from data to command mode when DTR switches from ON to OFF* |
| GSM to application | OK | *command valid* |
| Application to GSM | AT&D2 | *Upon DTR switch from ON to OFF, the call is cleardown* |
| GSM to application | OK | *command valid* |

### 4.9.6 Set DSR signal &S

This commands controls the Data Set Ready (DSR) signal.

| | | |
|---|---|---|
| Application to GSM | AT&S0 | *DSR always on* |
| GSM to application | OK | *command valid* |
| Application to GSM | AT&S1 | *DSR off in command mode, DSR on in data mode* |
| GSM to application | OK | *command valid* |

### 4.9.7 Back to online mode O

If you have established a connection and the mobile is in online command mode, this command allows to return to online data mode.

| | | |
|---|---|---|
| Application to GSM | ATO | |
| GSM to application | OK | *Command valid* |

### 4.9.8 Result code suppression Q

Determines whether the mobile sends result codes or not

| | | |
|---|---|---|
| Application to GSM | ATQ0 | *DCE transmits result codes* |
| GSM to application | OK | *Command valid* |
| Application to GSM | ATQ1 | *Result codes are suppressed and not transmitted* |
| GSM to application | (none) | *no response* |

### 4.9.9 DCE response format V

Determines the DCE response format, with or without header characters <CR><LF>, and with the use of numeric result codes.

| | V0 | V1 |
|---|---|---|
| Information responses | <text><CR><LF> | *<CR><LF>*<br>*<text><CR><LF>* |
| Result codes | <numeric code><CR> | *<CR><LF>*<br>*<verbose code><CR><LF>* |

| | | |
|---|---|---|
| Application to GSM | ATV0 | *DCE transmits limited headers and trailers and numeric result codes* |
| GSM to application | 0 | *command is valid (0 means OK)* |
| Application to GSM | ATV1 | *DCE transmits full headers and trailers and verbose response text* |
| GSM to application | OK | *command is valid* |

### 4.9.10 Default configuration Z

Restores the configuration profile.

| | | |
|---|---|---|
| Application to GSM | ATZ | |
| GSM to application | OK | *Command valid* |

### 4.9.11 Save configuration &W

This commands writes the active configuration to a non-volatile memory (EEPROM). Description of the stored parameters is in **Erreur! Source du renvoi introuvable.**

| | | |
|---|---|---|
| Application to GSM | AT&W | *Writes current configuration to E2prom* |
| GSM to application | OK | *command valid* |

### 4.9.12 Auto-tests &T

AT&T0 is used to perform auto-tests. The response will be OK if no software problem is detected (E2P, RAM and ROM checksums), otherwise a simple ERROR response is sent.
AT&T1 is used to close the audio loop, and AT&T2 is used to open the audio loop. This is used to validate the audio loop (microphone to speaker).

| | | |
|---|---|---|
| Application to GSM | AT&T0 | *Perform software auto-tests* |
| GSM to application | OK | *No software problem detected, all checksums are correct* |
| Application to GSM | AT&T1 | *Do the audio loop test (close)* |
| GSM to application | OK | *command valid* |
| Application to GSM | AT&T2 | *Stop the audio loop test (open)* |
| GSM to application | OK | *command valid* |

## 4.10 Specific AT commands

### 4.10.1 Cell environment description +CCED

This command can be used by the application to retrieve the cell parameters of the main cell and of up to six neighbour cells.
Two ways may exist for the external application to know these cell parameters: on request of the application, or automatically by the module every 5 seconds.
The automatic mode is not supported during communication or registration.
The command to manage this functionality is:
Command syntax: AT+CCED=<mode>[, <requested dump>]

* <mode>:

| | |
|---|---|
| 0 | One shot requested |
| 1 | Automatic shots requested |
| 2 | Stop automatic shots |

* <requested dump>:

| | |
|---|---|
| 1 | Main Cell:<br>MCC, MNC, LAC, CI, BSIC, BCCH Freq (absolute), RxLev, RxLev Full, RxLev Sub, RxQual, RxQual Full, RxQual Sub,Idle TS |
| 2 | Neighbour1 to Neighbour6:<br>MCC, MNC, LAC, CI, BSIC, BCCH Freq (absolute), RxLev |
| 4 | Timing Advance |

Combination (addition of the values) of the requested dumped are supported.
Notice that in idle mode, only RxLev measures (one the main cell and on the neighbour cells) are done. The value of these RxLev is set in the RxLev Full field for the main cell.
The response will be:

```
+CCED:<value>, ... , <value>
OK
```

Where <value> is the ASCII string of the values (in hexadecimal) of the parameters. If a field can not be measured - or has no sense - the parameter is not filled (two consecutive commas are then found).

### 4.10.2 Automatic RxLev indication +CCED

The CCED command has been extended to indicate the the *received signal strength indication* (rssi) of the main cell. The principle of the command is not changed:

Command Syntax: AT+CCED=<mode>[, <requested dump>]

* <mode>:

| | |
|---|---|
| 0 | One shot requested |
| 1 | Automatic shots requested |
| 2 | Stop automatic shots |

* <requested dump>:

| | |
|---|---|
| 8 | Main cell RSSI indications (RxLev) from 0 to 31 |

The response will be a +CSQ answer and not a +CCED answer. The 07.07 format for the +CSQ is respected. The <ber> is not evaluated by this command, so the <ber> value will always be 99.

+CSQ:<rssi>, 99
OK

This +CSQ answer, when automatic shots are selected, is sent every time the <rssi> measured by the module changes. This automatic shots are supported in idle mode and during communication.
Combination (addition of the values) of the requested dumped (1,2,4,8) are supported. Both answer +CCED and +CSQ may be then generated.

### 4.10.3 General Indications +WIND

Wavecom introduced a general mechanism to send unsollicited non standardized indication to the customer application. The yet identified unsollicited non standardized indications are:

- indication of a physical change on the SIM presence pin from connector (meaning SIM inserted, SIM removed)
- indication during a mobile originated call establishement, that the calling party is ringing.
- Indication of the availability of the module, after boot, to receive AT commands

For each of these indications, a "bit flow" has to be indicated. The syntax of the command is:

Command syntax: AT+WIND= <IndLevel >

| <IndLevel> | **Indication** |
|---|---|
| 1 | Hardware SIM Insert / Remove indications (Rack open/close) |
| 2 | Calling party alert indication |
| 4 | Module is ready to treat AT commands (except phonebooks, AOC, SMS), but still in emergency mode. |
| 8 | Indication that the module is ready to treat all AT commands, at te end of init, or after ADN / FDN swap |

If <IndLevel> is equal to 0 (default value), no unsolicited "+WIND: <IndNb>" will occur.

Combination (addition of the values) shall be used to allow more than one indication flow.
The answer is OK if the value are in the previous range.
The unsolicited answer will then be:
+WIND: <indicated event>
The yet defined indicated event list is:

| <event> | Meaning |
|---|---|
| 0 | The SIM presence pin has been detected as "SIM removed" (depending from the 0 bit flow) |
| 1 | The SIM presence pin has been detected as "SIM inserted" |
| 2 | Calling party is alerting |
| 3 | Module is ready to treat AT commands (except phonebooks, AOC, SMS), at init or after AT+CFUN=1 |
| 4 | Module is ready to treat all AT commands, end of phonebook init or swap (ADN to FDN, or FDN to ADN) |

AT+WIND? Command is supported and indicates the <allowed bit flows>.
AT+WIND is automatically stored in e2p. This means the &W commands has not to be used. And the selected flows are always activated after boot.
Default value is 0: No flow activated. No indication.

### 4.10.4 Data ciphering mode between ME and MSC +ALEA

This command is used to get a random value from the mobile station and to reenter it codes by the DES algorithm. In the way Application to GSM, an "h" character shall be added before the value.

| | | |
|---|---|---|
| Application to GSM | AT+ALEA? | *get random value* |
| GSM to Application | AT+ALEA=1234567890123456<br>OK | *command valid* |
| Application to GSM | AT+ALEA=hA125B348ABCDEF9 | *value coded* |
| GSM to Application | +ALEA=9876543210FBCADE0<br>OK | *value coded valid*<br>*new random value sent* |
| Application to GSM | AT+ALEA=h12335678902234AB | *new coded value* |
| GSM to Application | NO CARRIER | *coded value false*<br>*communication hang up* |

### 4.10.5 Data ciphering mode +CRYPT

This command enables or disables the data ciphering (D.E.S algorithm) of the PIN and a random value sent periodically in order to insure a more secure communication.

| | | |
|---|---|---|
| Application to GSM | AT+CRYPT=0 | *Ciphering off* |
| GSM to Application | OK | *command valid* |
| Application to GSM | AT+CRYPT=1 | *Ciphering on* |
| GSM to Application | OK | *command valid* |

### 4.10.6 Key management +EXPKEY

This command is used to enter the key used in the D.E.S algorithm to cipher the data (PIN ). In the way Application to GSM, an "h" character shall be added before the value.

| | | |
|---|---|---|
| Application to GSM | AT+EXPKEY? | *Is a key stored in E2PROM?* |
| GSM to Application | +EXPKEY: NO KEY | *key is absent* |
| Application to GSM | AT+EXPKEY=h0111011101110111 | *new key entered* |
| GSM to Application | OK | *command valid* |
| Application to GSM | AT+EXPKEY? | *Is a key stored in E2PROM?* |
| GSM to Application | +EXPKEY: READY | *key is present* |

### 4.10.7 Informations on PLMN +CPLMN

This command returns the status and the number of all PLMNs seen by the mobile. It also indicates the BCCH frequency number (absolute) of the strongest cell and its RxLev

| | | |
|---|---|---|
| Application to GSM | AT+CPLMN=? | |
| GSM to application | +CPLMN: (2,20810,122,50), (0,20801,64,53)<br>OK | *as defined as AT+COPS=? in the GSM TS 07 07* |

### 4.10.8 Analog digital converters measurements +ADC

This command allows to get the DC level of ADC A and ADC B (those voltages are coded on 8 bits from 0.5 V to 4.5 V ). Those values are updated every 10 seconds.

| | | |
|---|---|---|
| Application to GSM | AT+ADC? | |
| GSM to application | +ADC: 5,4<br>OK | ADC A , ADC B |

### 4.10.9 Mobile Equipment event reporting +CMER

This command enabled or disables sending of unsolicited result codes in the case of key pressing.

Command Syntax: AT+CMER=<mode>,<keyp>,<disp>,<ind>,<bfr>

<keyp> (keypad):

| | |
|---|---|
| 0 | No keypad event reporting. |
| 1 | Keypad event reporting are routed using unsolicited code:<br>+CKEV: <key>, <press> |

<press>
1: key press
0: key release

<key>: Keyboard map is (5,5)

| | | | | |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 |

### 4.10.10 Read Language Preference +WLPR

Command syntax: AT+WLPR= <index >
Response syntax: +WLPR: <value>
Read a Language Preference value of EF-LP. The first indexes sould have the highest priority.

| | | |
|---|---|---|
| Application to GSM | AT+WLPR? | Read command |
| GSM to application | +WLPR: 4<br>OK | Four language preference are available in EF-LP |
| Application to GSM | AT+WLPR=1 | *Read first EF-LP index value* |
| GSM to application | +WLPR: 5<br>OK | Language preference is 5 |

### 4.10.11 Write Language Preference+WLPW

Command syntax: AT+WLPW=<index >,<value>
Response syntax: OK or +CME ERROR: <err>
Write a Language Preference value in EF-LP

| | | |
|---|---|---|
| Application to GSM | AT+WLPW=1,5 | *Write Lang Pref equal to 5 in EF-LP with index 1* |
| GSM to application | OK | EF-LP correctly updated |

### 4.10.12 Read GPIO value +WIOR

Command syntax: AT+WIOR=<index >
Response syntax: +WIOR: <value>
Set the I/O port as an input and read the I/O pin, 0 if the pin is reset, 1 if the pin is set. Eight I/O ports are available, so the <index> value is between 0 and 7.

| | | |
|---|---|---|
| Application to GSM | AT+WIOR=4 | *Read I/O (number 4) value* |
| GSM to application | +WIOR: 0<br>OK | GPIO number 4 is reset |

### 4.10.13 Write GPIO value +WIOW

Command syntax: AT+WIOW=<index >,<value>
Response syntax: OK
Set the I/O port as an output with a I/O pin value, 0 for reset, 1 for set

| | | |
|---|---|---|
| Application to GSM | AT+WIOW=4,0 | *Reset I/O (number 4)* |
| GSM to application | OK | GPIO value is written |

## 4.11 Other AT commands

### 4.11.1 V.25 ter recommandation

Other remaining basic commands are not implemented, so an "ERROR" string will be sent back.
All commands about modulation control, error control and data compression are not recognized. An "ERROR" string will be sent back.

### 4.11.2 GSM 07.05 recommandation

All the remaining commands are not implemented, so an "ERROR" string will be sent back.

### 4.11.3 GSM 07.07 recommandation

All the remaining commands are not implemented, so an "ERROR" string will be sent back.

## 4.12 Fax Management commands

The fax service provided by the module is class 1 compatible. However only the core commands defined by ITU T.31 are supported. These are:

- AT+FRH=3, AT+FRH=?,
- AT+FTH=3, AT+FTH=?,
- AT+FRM=24,48,72,96, AT+FRM= ?,
- AT+FTM=24,48,72,96, AT+FTM= ?,
- AT+FRS= <any duration>,
- AT+FTS= <any duration>.

It means that commands like AT+FAR, +FCC,... are not supported.

### 4.12.1 Setting up the module for fax

When autobauding is enabled, nothing special has to be done. However when not enabled, proceed as described below to set up the module for fax.
The GSM unit as well as the PC fax application have to be properly set up prior to sendind/receiving faxes.
The only thing to do is to change the serial link rate as follows:
a) Launch any terminal application on PC and set it up to 9600 baud.
b) From the terminal application type in: AT+IPR = 2400; &W <enter>
The GSM unit should reply OK (if not, type in 'AT<enter>' as long as it does not answer 'OK' and start again stage b).

### 4.12.2 Setting up the PC fax application:

The recommended fax application is *Delrina WinFax v8.0*.
It should be configured as follows (menu Setup/Fax Modem Setup):

- Port: any com
- Model: Generic Class 1 (hardware flow control). A generic class 1 with software flow control can be also selected.
- Init: default string is suitable for the module
- Reset: default string is suitable for the module
- Maximum Transmit Rate: 9600 baud (if higher then rate will be automatically cut back to 9600 baud).

Others settings are of no relevance for the GSM unit: they can be modified.

### 4.12.3 Restoring the module's default profile for data call.

As for setting up the module for fax, the following instructions are irrelevant if autobauding is enabled.
If the module is configured as stated in 10.1 then the serial rate is 2400 baud which of course limits the overall thoughput in support of 4800/9600 data calls.
Therefore, the serial rate should be set back to 9600 (or better 19200) baud by issueing: AT+IPR = 9600; &W <enter>

# 5 Miscellaneous

## 5.1 Disclaimer

Modem and GSM-unit specifications and manuals are subject to change without notice. Wavecom assumes no liability for damage incurred directly or indirectly from errors, omissions or discrepancies between the modem or GSM-unit and their manuals.

## 5.2 Trademarks

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# 6 Appendices

## 6.1 ME error result code: +CME ERROR: <error>

| <error> | Meaning | Resulting from the following commands |
|---|---|---|
| 3 | Operation not allowed | All GSM 07.07 commands (+CME ERROR: 3) |
| 4 | Operation not supported | All GSM 07.07 commands (+CME ERROR: 4) |
| 5 | PH-SIM PIN required (SIM lock) | All GSM 07.07 commands (+CME ERROR: 5) |
| 10 | SIM not inserted | All GSM 07.07 commands (+CME ERROR: 10) |
| 11 | SIM PIN required | All GSM 07.07 commands (+CME ERROR: 11) |
| 12 | SIM PUK required | All GSM 07.07 commands (+CME ERROR: 12) |
| 13 | SIM failure | All GSM 07.07 commands (+CME ERROR: 13) |
| 16 | Incorrect password | +CACM, +CAMM, +CPUC, +CLCK, +CPWD, +CPIN, +CPIN2 (+CME ERROR: 16) |
| 17 | SIM PIN2 required | +CPBW (FDN), +CLCK (FDN), |
| 18 | SIM PUK2 required | +CACM, +CAMM, +CPUC, +CPBW (FDN), +CPIN, +CPIN2, +CLCK (FDN), +CPWD |
| 20 | Memory full | +CPBW |
| 21 | Invalid index | +CPBR, +CPBW, ATD>index |
| 22 | Not found | +CPBF, +CPBP, +CPBN, +CGSN, +WOPN |
| 24 | Text string too long | +CPBW, +IMEI, +CPIN, +CPIN2, +CLCK, +CPWD |
| 26 | Dial string too long | +CPBW, ATD, +CCFC |
| 30 | No network service | +VTS, +COPS=?, +CPLMN, +CLCK, +CCFC, +CCWA |
| 40 | Network personalisation PIN required (Network lock) | All GSM 07.07 commands (+CME ERROR: 40) |

## 6.2 Message service failure result code: +CMS ERROR: <er>

<er> is defined as below:

| <er> | Meaning | Resulting from the following commands |
|---|---|---|
| 1 to 127 | Error cause values from the GSM recommendation 04.11 Annex E-2 | +CMGS, +CMSS |
| 301 | SMS service of ME reserved | +CSMS (with +CMS: ERROR 301) |
| 302 | Operation not allowed | All SMS commands (+CMSS, +CMGL, +CPMS, +CSMP... |
| 303 | Operation not supported | All SMS commands |
| 304 | Invalid PDU mode parameter | +CMGS, +CMGW, |
| 305 | Invalid text mode parameter | +CMGS, +CMGW, +CMSS |
| 310 | SIM not inserted | All SMS commands |
| 311 | SIM PIN required | All SMS commands |
| 312 | PH-SIM PIN required | All SMS commands |
| 313 | SIM failure | All SMS commands |
| 316 | SIM PUK required | All SMS commands |
| 317 | SIM PIN2 required | All SMS commands |
| 318 | SIM PUK2 required | All SMS commands |
| 321 | Invalid memory index | +CMGR, +CMSS, +CMGD, +CMGL |
| 322 | SIM memory full | +CMGW |
| 330 | SC address unknown | +CSCA?, +CMSS, +CMGS |

## 6.3 Specific error result codes

| <error> | Meaning | Resulting from the following commands |
|---|---|---|
| 512 | MM establishment failure (for SMS) | +CMGS, +CMSS (+CMS ERROR: 512) |
| 513 | Lower layer failure (for SMS) | +CMGS, +CMSS |
| 514 | CP error (for SMS) | +CMGS, +CMSS |
| 515 | Please wait, init or command processing in progress | All commands ( “+CME ERROR: 515” or “+CMS ERROR: 515”) |

## 6.4 IE Cause values from GSM 04.08 recommendation

| Cause value | Diagnostic |
|---|---|
| 1 | Unassigned (unallocated) number |
| 3 | No route to destination |
| 6 | Channel unacceptable |
| 8 | Operator determined barring |
| 16 | Normal call clearing |
| 17 | User busy |
| 18 | No user responding |
| 19 | User alerting, no answer |
| 21 | Call rejected |
| 22 | Number changed |
| 26 | Non selected user clearing |
| 27 | Destination out of order |
| 28 | Invalid number format (incomplete number) |
| 29 | Facility rejected |
| 30 | Response to STATUS ENQUIRY |
| 31 | Normal, unspecified |
| 34 | No circuit/channel available |
| 38 | Network out of order |
| 41 | Temporary failure |
| 42 | Switching equipment congestion |
| 43 | Access information discarded |
| 44 | Requested circuit/channel not available |
| 47 | Resources unavailable, unspecified |
| 49 | Quality of service unavailable |
| 50 | Requested facility not subscribed |
| 55 | Incoming calls barred with in the CUG |
| 57 | Bearer capability not authorized |
| 58 | Bearer capability not presently available |
| 63 | Service or option not available, unspecified |
| 65 | Bearer service not implemented |
| 68 | ACM equal to or greater than ACMmax |
| 69 | Requested facility not implemented |
| 70 | Only restricted digital information bearer capability is available |
| 79 | Service or option not implemented, unspecified |
| 81 | Invalid transaction identifier value |
| 87 | User not member of CUG |
| 88 | Incompatible destination |
| 91 | Invalid transit network selection |
| 95 | Semantically incorrect message |
| 96 | Invalid mandatory information |
| 97 | Message type non-existent or not implemented |
| 98 | Message type not compatible with protocol state |
| 99 | Information element non-existent or not implemented |
| 100 | Conditional IE error |
| 101 | Message not compatible with protocol state |
| 102 | Recovery on timer expiry |
| 111 | Protocol error, unspecified |
| 127 | Interworking, unspecified |
| 252 | Call barring on outgoing calls |
| 253 | Call barring on incoming calls |
| 254 | Call impossible |
| 255 | Lower layer failure |

All other values in the range 0 to 31 shall be treated as cause 31.
All other values in the range 32 to 47 shall be treated as cause 47.
All other values in the range 48 to 63 shall be treated as cause 63.
All other values in the range 64 to 79 shall be treated as cause 79.
All other values in the range 80 to 95 shall be treated as cause 95.
All other values in the range 96 to 111 shall be treated as cause 111.
All other values in the range 112 to 127 shall be treated as cause 127.

## 6.5 GSM 04.11 Annex E-2: Mobile originating SM-transfer

These error causes could appear for SMS commands (+CMGS, +CMSS, +CMGD...)

Cause no 1: "Unassigned (unallocated) number"
This cause indicates that the destination requested by the Mobile Station cannot be reached because, although the number is in a valid format, it is not currently assigned (allocated).
Cause no 8: "Operator determined barring"
This cause indicates that the MS has tried to send a mobile originating short message when the MS's network operator or service provider has forbidden such transactions.
Cause no 10: "Call barred"
This cause indicates that the outgoing call barred service applies to the short message service for the called destination.
Cause no 21: "Short message transfer rejected"
This cause indicates that the equipment sending this cause does not wish to accept this short message, although it could have accepted the short message since the equipment sending this cause is neither busy nor incompatible.
Cause no 27: "Destination out of service"
This cause indicates that the destination indicated by the Mobile Station cannot be reached because the interface to the destination is not functioning correctly. The term "not functioning correctly" indicates that a signalling message was unable to be delivered to the remote user; e.g., a physical layer or data link layer failure at the remote user, user equipment off-line, etc.
Cause no 28: "Unidentified subscriber"
This cause indicates that the subscriber is not registered in the PLMN (i.e. IMSI not known)
Cause no 29: "Facility rejected"
This cause indicates that the facility requested by the Mobile Station is not supported by the PLMN.
Cause no 30: "Unknown subscriber"
This cause indicates that the subscriber is not registered in the HLR (i.e. IMSI or directory number is not allocated to a subscriber).
Cause no 38: "Network out of order"
This cause indicates that the network is not functioning correctly and that the condition is likely to last a relatively long period of time; e.g., immediately reattempting the short message transfer is not likely to be successful.
Cause no 41: "Temporary failure"
This cause indicates that the network is not functioning correctly and that the condition is not likely to last a long period of time; e.g., the Mobile Station may wish to try another short message transfer attempt almost immediately.
Cause no 42: "Congestion"
This cause indicates that the short message service cannot be serviced because of high traffic.
Cause no 47: "Resources unavailable, unspecified"
This cause is used to report a resource unavailable event only when no other cause applies.
Cause no 69: "Requested facility not implemented"
This cause indicates that the network is unable to provide the requested short message service.
Cause no 81: "Invalid short message transfer reference value"
This cause indicates that the equipment sending this cause has received a message with a short message reference which is not currently in use on the MS-network interface.
Cause no 95: "Invalid message, unspecified"
This cause is used to report an invalid message event only when no other cause in the invalid message class applies.

Cause no 96: "Invalid mandatory information"
This cause indicates that the equipment sending this cause has received a message where a mandatory information element is missing and/or has a content error (the two cases are undistinguishable).
Cause no 97: "Message type non-existent or not implemented"
This cause indicates that the equipment sending this cause has received a message with a message type it does not recognize either because this is a message not defined or defined but not implemented by the equipment sending this cause.
Cause no 98: "Message not compatible with short message protocol state"
This cause indicates that the equipment sending this cause has received a message such that the procedures do not indicate that this is a permissible message to receive while in the short message transfer state.
Cause no 99: "Information element non-existent or not implemented"
This cause indicates that the equipment sending this cause has received a message which includes information elements not recognized because the information element identifier is not defined or it is defined but not implemented by the equipment sending the cause.
However, the information element is not required to be present in the message in order for the equipment sending the cause to process the message.
Cause no 111: "Protocol error, unspecified"
This cause is used to report a protocol error event only when no other cause applies.
Cause no 127: "Interworking, unspecified"
This cause indicates that there has been interworking with a network which does not provide causes for actions it takes; thus, the precise cause for a message which is being send cannot be ascertained.
All values other than specified should be treated as error Cause No 41

## 6.6 Unsolicited result codes

| Verbose result code | Numeric (V0 set) | Description |
|---|---|---|
| RING | 2 | Incoming call signal from network |
| +CMTI: <mem>,<index> | as verbose | Incoming message stored in <mem> ("SM") at location <index> |
| +CMT: <oa>... (text mode)<br>or +CMT: [<alpha>,]... (PDU) | as verbose | Incoming message directly displayed |
| +CDS: <fo>, <mr>... (text mode)<br>or +CDS: <length>,... (PDU) | as verbose | SMS status report after sending a SMS |
| +CCCM: <ccm> | as verbose | Current Call Meter value |
| +CKEV: <keynb> | as verbose | Key press or release |
| +CCWA: <nb>,<type>,<class> | as verbose | Call Waiting number |
| +CLIP: <number>,<type> | as verbose | Incoming Call Presentation |
| +CREG: <stat> | as verbose | Network registration indication |
| +CRING: <type> | as verbose | Incoming call type (VOICE, FAX ...) |
| +WIND: <IndicationNb> | as verbose (specific) | Specific unsolicited indication (SIM Insert/Remove, End of init, Reset, Alerting) |
| +CSQ: <RxLev>,99 | as verbose (specific) | Automatic RxLev indication with AT+CCED=1,8 command |

## 6.7 Final result codes

| Verbose result code | Numeric (V0 set) | Description |
|---|---|---|
| +CME ERROR: <err> | as verbose | Error from 07.05 commands |
| +CMS ERROR: <err> | as verbose | Error from SMS commands (07.07) |
| BUSY | 7 | Busy signal detected |
| ERROR | 4 | Command not accepted |
| NO ANSWER | 8 | Connection completion timeout |
| NO CARRIER | 3 | Connection terminated |
| OK | 0 | Acknowledges correct execution of a command line |
| RING | 2 | Incoming call signal from network |

## 6.8 Intermediate result codes

| Verbose result code | Numeric (V0 set) | Description |
|---|---|---|
| +COLP:<number>,<type> | as verbose | Outgoing Call Presentation |
| +CR: <type> | as verbose | Outgoing Call report control |
| +ILRR: <rate> | as verbose | Local TA-TE data rate |
| CONNECT 300 | 10 | Data connection at 300 bauds |
| CONNECT 1200 | 11 | Data connection at 1200 bauds |
| CONNECT 1200/75 | 12 | Data connection at 1200/75 bauds |
| CONNECT 2400 | 13 | Data connection at 2400 bauds |
| CONNECT 4800 | 14 | Data connection at 4800 bauds |
| CONNECT 9600 | 15 | Data connection at 9600 bauds |

## 6.9 Operator names

| Country Initials | MCC | MNC | Name | Type of Network | Country Name |
|---|---|---|---|---|---|
| A | 232 | 1 | AUSTRIA A1 | GSM900 | Austria |
| A | 232 | 3 | MAX.MOBIL | GSM900 | Austria |
| AL | 726 | 1 | AL A M C | GSM900 | Albania |
| AND | 213 | 3 | MOBILAND | GSM900 | Andorra |
| AUS | 505 | 1 | AUS M-NET | GSM900 | Australia |
| AUS | 505 | 2 | AUS OPTUS | GSM900 | Australia |
| AUS | 505 | 3 | AUS VODAFONE | GSM900 | Australia |
| AZE | 40 | 1 | AZE ACELL | GSM900 | AZE |
| B | 206 | 10 | B mobi | GSM900 | Belgium |
| BEL | 206 | 1 | BEL PROXIMUS | GSM900 | Belgium |
| BG | 284 | 1 | BG CITRON | GSM900 | |
| BHR | 426 | 1 | BHR M.PLUS | GSM900 | Bahrein |
| BIH | 218 | 90 | BIH BHGSM | GSM900 | Bosnia |
| CAM | 624 | 1 | CAM CAMNET | GSM900 | Cameroon |
| CAN | 302 | 37 | CAN MCELL | PCS1900 | Canada |
| CH | 228 | 1 | CH SWISS GSM | GSM900 | Switzerland |
| CHN | 460 | 0 | CHNTELGSM | GSM900 | China |
| CHN | 460 | 1 | CHN-CUGSM | GSM900 | China |
| CI | 612 | 3 | CI Ivoir | GSM900 | Ivory Cost |
| CL | 730 | 1 | CL ENTEL PCS | PCS1900 | USA |
| CL | 730 | 10 | CL ENTEL PCS | PCS1900 | USA |
| CYP | 280 | 1 | CY CYTA GSM | GSM900 | Cyprus |
| CZ | 230 | 1 | PAEGAS-CZ | GSM900 | Czechoslovakia |
| CZ | 230 | 2 | CZ ET-CZ | GSM900 | Czechoslovakia |
| D | 262 | 1 | D1-TELEKOM | GSM900 | Germany |
| D | 262 | 2 | D2 PRIVAT | GSM900 | Germany |
| D | 262 | 3 | E-Plus | GSM1800 | Germany |
| DK | 238 | 1 | DK TDK-MOBIL | GSM900 | Denmark |
| DK | 238 | 2 | DK SONOFON | GSM900 | Denmark |
| DK | 238 | 20 | TELIA DK | GSM1800 | Denmark |
| DK | 238 | 30 | DK mobilix | GSM1800 | Denmark |
| E | 214 | 1 | E AIRTEL | GSM900 | Spain |
| E | 214 | 7 | E TELEFONICA | GSM900 | Spain |
| E | 340 | 18 | E AMERIS | | Spain |
| EE | 248 | 1 | EE EMT GSM | GSM900 | Estonia |
| EE | 248 | 2 | EE RLE | GSM900 | Estonia |
| ETH | 636 | 1 | ETH MTN | GSM900 | Ethiopia |
| F | 208 | 1 | F Itineris | GSM900 | France |
| F | 208 | 10 | F SFR | GSM900 | France |
| F | 208 | 20 | F BOUYGTEL | GSM1800 | France |
| F | 547 | 20 | F VINI | GSM900 | France |
| F | 647 | 10 | F SFR RU | GSM900 | France Reunion |
| FI | 244 | 3 | FI TELIA | GSM1800 | Finland |
| FI | 244 | 5 | FI RADIOLINJ | GSM900 | Finland |
| FI | 244 | 9 | FI FINNET | GSM1800 | Finland |
| FI | 244 | 91 | FI SONERA | GSM900 | Finland |
| FIJ | 542 | 1 | FIJ VODAFJ | GSM900 | Fiji |
| GEO | 282 | 1 | GEO GCELL | GSM900 | Georgia |
| GEO | 282 | 2 | GEO Magti | GSM900 | Georgia |
| GIB | 266 | 1 | GIBTEL GSM | GSM900 | England Gibraltar |
| GR | 202 | 1 | GR COSMOTE | GSM1800 | Greece |
| GR | 202 | 5 | GR PANAFON | GSM900 | Greece |
| GR | 202 | 10 | GR TELESTET | GSM900 | Greece |
| H | 216 | 1 | H Pannon GSM | GSM900 | Hungary |
| H | 216 | 30 | H-WESTEL 900 | GSM900 | Hungary |
| HK | 454 | 0 | HK TCSL GSM | GSM900 | Hong Kong |
| HK | 454 | 4 | HK HTCLGSM | GSM900 | Hong Kong |

| Country Initials | MCC | MNC | Name | Type of Network | Country Name |
|---|---|---|---|---|---|
| HK | 454 | 6 | HK SMARTONE | GSM900 | Hong Kong |
| HK | 454 | 10 | HK NWT | GSM1800 | Hong Kong |
| HK | 454 | 12 | HK PEOPLES | GSM1800 | Hong Kong |
| HK | 454 | 16 | HK SUNDAY | GSM1800 | Hong Kong |
| HK | 454 | 18 | HK PAC-LINK | | Hong Kong |
| HK | 454 | 20 | HK HUTCHINSON | | Hong Kong |
| HK | 454 | 22 | HK P PLUS | | Hong Kong |
| HR | 219 | 1 | HR CRONET | GSM900 | Croatia |
| I | 222 | 1 | I TELECOM | GSM900 | Italy |
| I | 222 | 10 | I OMNITEL | GSM900 | Italy |
| INA | 404 | 7 | INA TATA | GSM900 | India |
| INA | 404 | 10 | INA AirTel | GSM900 | India |
| INA | 404 | 11 | INA ESSAR | GSM900 | India |
| INA | 404 | 12 | INA ESCOTL | GSM900 | India |
| INA | 404 | 19 | INA ESCOTL | | India |
| INA | 404 | 21 | INA BPL | GSM900 | India |
| INA | 404 | 27 | INA BPLMOBIL | GSM900 | India |
| INA | 404 | 41 | INA RPG | GSM900 | India |
| INA | 404 | 43 | INA BPLMOBIL | GSM900 | India |
| INA | 404 | 46 | INA BPLMOBIL | GSM900 | India |
| INA | 404 | 56 | INA ESCOTL | | India |
| IND | 510 | 1 | IND SAT-C | GSM900 | Indonesia |
| IND | 510 | 10 | IND T-SEL | GSM900 | Indonesia |
| IND | 510 | 11 | IND EX-CEL | GSM900 | Indonesia |
| IRL | 272 | 1 | IRL EIR-GSM | GSM900 | Eire |
| IRL | 272 | 2 | IRL DIGIFONE | GSM900 | Eire |
| IS | 274 | 1 | IS SIMINN | GSM900 | Iceland |
| JOR | 416 | 1 | JOR FSTLNK | GSM900 | Jordan |
| KHM | 456 | 1 | KHM MT-KHM | GSM900 | Cambodia |
| KSA | 420 | 1 | KSA DMTS-1 | GSM900 | Saudi Arabia |
| KSA | 420 | 7 | KSA EAE | GSM900 | Saudi Arabia |
| KT | 419 | 2 | KT MTC | GSM900 | |
| L | 270 | 1 | L LUXGSM | GSM900 | Luxemburg |
| LSO | 651 | 1 | LSO VCLCOM | GSM900 | Lesotho |
| LT | 246 | 2 | LT BITE | GSM900 | |
| LTU | 246 | 1 | LTU OMT | GSM900 | |
| LV | 247 | 1 | LV LMT GSM | GSM900 | Latvia |
| LV | 247 | 2 | LV BALTEL | GSM900 | Latvia |
| MAC | 455 | 1 | MAC CTMGSM | GSM900 | |
| MKD | 294 | 1 | MKD MOBI-M | GSM900 | Macedonia |
| MOR | 604 | 10 | MOR MOR ONPT | GSM900 | Morocco |
| MRU | 617 | 1 | MRU CELL + | GSM900 | Mauritius |
| MW | 650 | 1 | MW CP 900 | GSM900 | Malawi |
| MY | 502 | 12 | MY maxis | GSM900 | Malaysia |
| MY | 502 | 13 | MY EMARTEL | GSM1800 | Malaysia |
| MY | 502 | 16 | MY DIGI 1800 | GSM1800 | Malaysia |
| MY | 502 | 17 | MY-ADAM 017 | GSM1800 | Malaysia |
| MY | 502 | 19 | MY CELCOM | GSM900 | Malaysia |
| N | 242 | 1 | N TELE-MOBIL | GSM900 | Norway |
| N | 242 | 2 | N NetCom GSM | GSM900 | Norway |
| NL | 204 | 4 | NL LIBTEL | GSM900 | Netherlands |
| NL | 204 | 8 | NL PTT TELE | GSM900 | Netherlands |
| NZ | 530 | 1 | NZ BELLSOUTH | GSM900 | New Zealand |
| OMN | 422 | 2 | OMN O-MOBI | GSM900 | Oman |
| P | 268 | 1 | P TELECEL | GSM900 | Portugal |
| P | 268 | 6 | P TMN | GSM900 | Portugal |
| PH | 515 | 1 | Islacom Cell | GSM900 | Philippines |
| PH | 515 | 2 | PH GLOBE | GSM900 | Philippines |
| PL | 260 | 1 | PLUS GSM | GSM900 | Poland |
| PL | 260 | 2 | ERA-GSM | GSM900 | Poland |

| Country Initials | MCC | MNC | Name | Type of Network | Country Name |
|---|---|---|---|---|---|
| QAT | 427 | 1 | QAT Q-NET | GSM900 | Qatar |
| RA | 283 | 1 | RA ARMMO1 | GSM900 | Armenia |
| RL | 415 | 1 | RL Cellis | GSM900 | Lebanon |
| RL | 415 | 3 | RL LibanCell | GSM900 | Lebanon |
| ROC | 466 | 6 | TWN TUNTEX | GSM1800 | Taiwan |
| ROC | 466 | 88 | KGT-Online | GSM1800 | Taiwan |
| ROC | 466 | 92 | ROC LDTA GSM | GSM900 | Rep.Of China |
| ROC | 466 | 97 | TWN GSM 1800 | GSM1800 | Taiwan |
| ROM | 226 | 1 | ROM CONNEX | | Romania |
| ROM | 226 | 10 | ROM DIALOG | | Romania |
| RUS | 250 | 1 | RUS MTS | GSM900 | Russia |
| RUS | 250 | 2 | RUS NWGSM | GSM900 | Russia |
| S | 240 | 1 | TELIA S | GSM900 | Sweden |
| S | 240 | 7 | S COMVIQ | GSM900 | Sweden |
| S | 240 | 8 | S EURO | GSM900 | Sweden |
| SA | 655 | 1 | VodaCom-SA | GSM900 | South Africa |
| SA | 655 | 10 | MTN-SA | GSM900 | South Africa |
| SDN | 634 | 1 | SDN SD-MOB | GSM900 | |
| SEZ | 633 | 1 | SEZ SEYCEL | GSM900 | Seychelles |
| SGP | 525 | 1 | ST-GSM-SGP | GSM900 | Singapore |
| SGP | 525 | 2 | GSM1800-SGP | GSM1800 | Singapore |
| SGP | 525 | 3 | SGP M1-GSM | GSM900 | Singapore |
| SI | 293 | 41 | SI SI-GSM | GSM900 | |
| SK | 231 | 1 | SK SVK GT | GSM900 | Slovakia |
| SK | 231 | 2 | SK ET-SK | GSM900 | Slovakia |
| SRI | 413 | 2 | SRI DIALOG | GSM900 | Sri Lanka |
| SYR | 263 | 9 | SYR MOBILE | GSM900 | Syria |
| SYR | 417 | 9 | SYR MOBILE | GSM900 | Syria |
| TH | 520 | 1 | TH AIS GSM | GSM900 | Thailand |
| TH | 520 | 10 | TH WCS | GSM1800 | Thailand |
| TR | 286 | 1 | TR PTT/TURK | GSM900 | Turkey |
| TR | 286 | 2 | TR TELSIM | GSM900 | Turkey |
| TZ | 640 | 1 | TZ TRITEL | GSM900 | Tanzania |
| UA | 255 | 3 | UA-KYIVSTAR | GSM900 | Ukraine |
| UA | 255 | 5 | UA GT-BCS | GSM1800 | Ukraine |
| UAE | 424 | 2 | UAE ETISALAT | GSM900 | United Arab Em |
| UK | 234 | 10 | UK CELLNET | GSM900 | England |
| UK | 234 | 15 | UK VODAFONE | GSM900 | England |
| UK | 234 | 30 | ONE 2 ONE | GSM1800 | England |
| UK | 234 | 33 | ORANGE | GSM1800 | England |
| UK | 234 | 50 | UK Jersey | GSM900 | England |
| UK | 234 | 55 | UK GUERNSEY | GSM900 | England |
| UK | 234 | 58 | UK MANX | GSM900 | England |
| UKR | 255 | 1 | UA UMC | | Ukraine |
| UKR | 255 | 2 | FLASH-UKR | GSM900 | Ukraine |
| USA | 310 | 10 | USA MCI | PCS1900 | USA |
| USA | 310 | 11 | USA WTTCKy | PCS1900 | USA |
| USA | 310 | 12 | USA D&E Com | PCS1900 | USA |
| USA | 310 | 13 | USA MobileTel | PCS1900 | USA |
| USA | 310 | 20 | USA Sprint | PCS1900 | USA |
| USA | 310 | 30 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 31 | USA-AERIAL | PCS1900 | USA |
| USA | 310 | 40 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 50 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 60 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 70 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 80 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 90 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 100 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 110 | USA PCS PRIME | PCS1900 | USA |

| Country Initials | MCC | MNC | Name | Type of Network | Country Name |
|---|---|---|---|---|---|
| USA | 310 | 120 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 130 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 140 | USA PCS PRIME | PCS1900 | USA |
| USA | 310 | 150 | USA BellSouth | PCS1900 | USA |
| USA | 310 | 160 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 170 | USA PAC BELL | PCS1900 | USA |
| USA | 310 | 180 | USA PAC BELL | PCS1900 | USA |
| USA | 310 | 190 | USA COX | PCS1900 | USA |
| USA | 310 | 200 | USA VStream | PCS1900 | USA |
| USA | 310 | 210 | USA VStream | PCS1900 | USA |
| USA | 310 | 220 | USA VStream | PCS1900 | USA |
| USA | 310 | 230 | USA VStream | PCS1900 | USA |
| USA | 310 | 240 | USA VStream | PCS1900 | USA |
| USA | 310 | 250 | USA VStream | PCS1900 | USA |
| USA | 310 | 260 | USA VStream | PCS1900 | USA |
| USA | 310 | 270 | USA PowerTel | PCS1900 | USA |
| USA | 310 | 280 | USA PowerTel | PCS1900 | USA |
| USA | 310 | 290 | USA PowerTel | PCS1900 | USA |
| USA | 310 | 300 | USA Aerial | PCS1900 | USA |
| USA | 310 | 310 | USA Aerial | PCS1900 | USA |
| USA | 310 | 320 | USA Aerial | PCS1900 | USA |
| USA | 310 | 330 | USA Aerial | PCS1900 | USA |
| USA | 310 | 340 | USA Aerial | PCS1900 | USA |
| USA | 310 | 350 | USA Aerial | PCS1900 | USA |
| USA | 310 | 380 | USA Pocket | PCS1900 | USA |
| USA | 310 | 390 | USA Pocket | PCS1900 | USA |
| USA | 310 | 400 | USA Pocket | PCS1900 | USA |
| USA | 310 | 410 | USA Pocket | PCS1900 | USA |
| USA | 310 | 420 | USA Pocket | PCS1900 | USA |
| USA | 310 | 430 | USA Pocket | PCS1900 | USA |
| USA | 310 | 440 | USA Pocket | PCS1900 | USA |
| USA | 310 | 450 | USA Pocket | PCS1900 | USA |
| USA | 310 | 460 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 470 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 480 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 490 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 500 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 510 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 520 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 530 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 540 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 550 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 560 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 570 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 580 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 610 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 620 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 630 | USA OMNIPOINT | PCS1900 | USA |
| USA | 310 | 640 | USA Einstein | PCS1900 | USA |
| USA | 310 | 660 | USA DiGiPH | PCS1900 | USA |
| USA | 310 | 670 | USA WTTCKy | PCS1900 | USA |
| USA | 310 | 680 | USA NPI | PCS1900 | USA |
| USA | 310 | 690 | USA Conestoga | PCS1900 | USA |
| VN | 452 | 1 | VN MOBIF | GSM900 | Vietnam |